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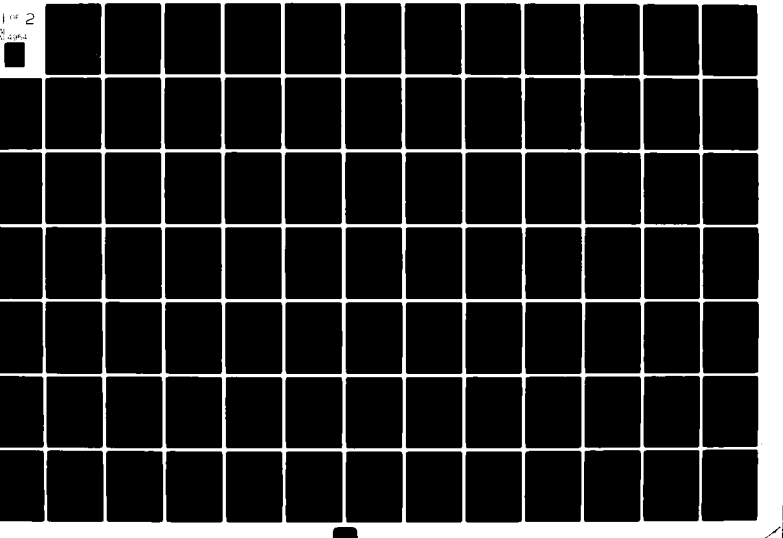

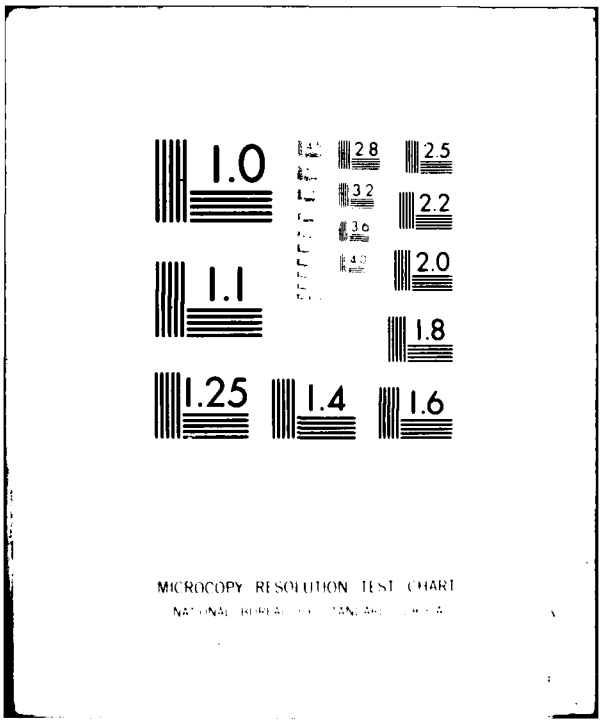
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SOVIET THEATER FORCE INTEGRATION AND ASSOCIATED VULNERABILITIES

J. A. Stevens
H. S. Marsh
Booz, Allen & Hamilton, Inc.
4330 East West Highway
Bethesda, Maryland 20014

1 June 1981

Final Report for Period 31 March 1980—1 June 1981

CONTRACT No. DNA 001-80-C-0195

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REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER: DNA 5749F	2. GOVT ACCESSION NO.: AD-A114 954
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE *(and Subtitle)*: SOVIET THEATER FORCE INTEGRATION AND ASSOCIATED VULNERABILITIES	5. TYPE OF REPORT & PERIOD COVERED: Final Report for Period 31 Mar 80—1 Jun 81
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): J. A. Stevens H. S. Marsh, Jr.	8. CONTRACT OR GRANT NUMBER(s): DNA 001-80-C-0195
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Booz, Allen & Hamilton, Inc. 4330 East West Highway Bethesda, Maryland 20014	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: Subtask V99QAXNL123-35
11. CONTROLLING OFFICE NAME AND ADDRESS: Director Defense Nuclear Agency Washington, D.C. 20305	12. REPORT DATE: 1 June 1981 13. NUMBER OF PAGES: 114
14. MONITORING AGENCY NAME & ADDRESS *(if different from Controlling Office)*	15. SECURITY CLASS *(of this report)*: UNCLASSIFIED 15a. DECLASSIFICATION DOWNGRADING SCHEDULE: N/A

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

This work sponsored by the Defense Nuclear Agency under RDT&E RMSS Code B325080464 V99QAXNL12335 H2590D.

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Integration	Vulnerabilities	TNF
Coordination	Theater Ops	Combined-Arms Ops
Command and Control	Planning	Soviet Threat
Substitutability		

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report assesses the importance and vulnerabilities of Soviet force integration in conducting theater missions against the U.S. Theater Nuclear Force (TNF). Roles which naval, air and ground forces play in integration are evaluated, as are the specific requirements for integration between force elements and the service branches. The Soviet planning process for integration is described, and a number of specific vulnerabilities (from command/control to theater-dependent variables) assessed for their impact on Soviet force integration.

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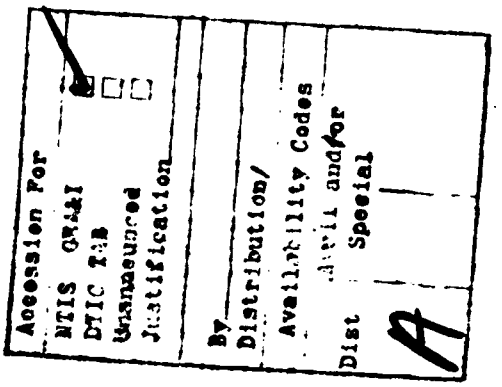


SUMMARY

The successful integration of land, sea, and air forces is an essential requirement in Soviet military thought. The concept of force integration is of such great importance to the Soviet military that it is highlighted as one of seven principles of operational art which guide commanders in achieving victory. Because of its significance, integration is discussed extensively in Soviet military literature, including the rationale for its use, its key components, and the potential problems which could mitigate against its success. This study examines each of these areas and assesses the potential vulnerabilities of force integration based on possible problems which the Soviets identify in its execution.

The concept of force integration is relatively complex; in general, it may be described as a process which requires effective timing and force coordination to be employed successfully. Soviet force integration at the theater level - the focal point of this study - is considered especially significant for efficient destruction of enemy theater nuclear forces (TNF). Because of the importance attached to this mission, Soviet force integration to achieve (NATO) TNF destruction requires special rules and procedures for implementation. Force integration at the theater level therefore finds expression in terms of missions which must be accomplished and priority targets which must be destroyed in a timely fashion for military victory.

Soviet force integration is discussed today and has been practiced historically at the strategic, operational,

and tactical levels. Each of these levels are examined in this study. The concept is also based on a number of key components:

- Rules and plans for conducting effective force integration;
- Requisite forces to complete integrated missions;
- Knowledgeable command/staff elements to transform static integration plans into dynamic operational realities; and
- An understanding of the enemy sufficient to focus integrated efforts in the attainment of military victory.

When force integration is well planned and executed, the Soviet military expects that it will perform the following desired functions:

- Upgrading the timely flow of intelligence from reconnaissance assets to strike forces;
- Providing Soviet commanders additional flexibility in replacing attrited forces and reallocating forces for new, high priority missions;
- Limiting any nonessential overlap of target assignments among available strike forces; and
- Providing requisite strike timing precision, especially for nuclear strikes where weapons' allocations and decisive timing are critical to victory.

Soviet discussions of force integration include candid comments about potential problems in its execution. These problems include:

- The criticality of having required forces available for mission execution;
- The possible misapplication of forces during an integration operation;
- Potential shortfalls in command responsiveness to changes in force commitments for integration;
- The likelihood of post-H-hour communication failures among participating forces;
- The prospect of inefficient strike allocations caused by excessively overlapping target coverage;
- Possible post-H-hour deficiencies in force readiness;
- Insufficient knowledge of threat intentions;
- Command/staff deficiencies (e.g., training, practice);
- Theater-specific factors (e.g., difficult terrain, inclement weather); and
- Failures in timing to achieve integration.

This study indicates that of these potential problems, the Soviet integration requirements for proper timing, continual communication, and sufficient reconnaissance data are the preeminent problems subject to potential U.S. exploitation. However, additional assessment would be required before more specific recommendations could be made on particular approaches the U.S. might take to exploit these Soviet-stated vulnerabilities.

In summary, Soviet force integration is a complex process which is potentially constrained by a number of interrelated problems enumerated above. Although the Soviets continually emphasize their commitment to addressing these vulnerabilities, their ability to do so remains an open question and deserves continued appraisal.

T A B L E O F C O N T E N T S

T A B L E O F C O N T E N T S (continued)

T A B L E O F C O N T E N T S (continued)

LIST OF ILLUSTRATIONS

INTRODUCTION

The main objective of this unclassified study is to provide a detailed analysis of one important component of Soviet operational art—the integration of Soviet forces (ground, aviation, and naval) at the theater (front, army) level. Such a study is predicated upon the continued need to assess Soviet intentions and capabilities to destroy the U.S. theater nuclear force (TNF). This study of Soviet force integration, therefore, not only attempts to provide a number of insights on integration as an operational concept important to Soviet forces, but also as an issue of the utmost relevance to the survivability of the U.S. TNF.

A number of salient questions guided the research and writing of this report. In order to provide the reader a conceptual overview of the major issues relevant to this study of Soviet force integration, these questions are enumerated below.

- How important (and how real) is the Soviet requirement for theater force integration in general?

- Is integration more important today to the Soviets than in the past (e.g. during World War II) and why or why not?

- What are the implications of its relative importance (or, conversely, lack of importance) for Soviet force capabilities and battlefield requirements?

- What is the primary motivation(s) behind the Soviet practice of force integration?

- What does Soviet force integration consist of and does its relative complexity influence its viability? If so, how?

- What are the potential vulnerabilities associated with the Soviet practice of force integration?

- Lastly, what are the implications of Soviet force integration for the U.S. generally, and for the survivability and employment of the U.S. TNF specifically? What is required for the U.S. to be able to capitalize on the potential vulnerabilities associated with Soviet force integration to offset these implications?

As the reader will note, primary unclassified Soviet military sources, the majority written during the period 1965-1980, served as the basis for assessing the major issues relevant to this study and for formulating answers to the above questions. Several of these sources deserve particular mention for their uniquely candid and extremely useful discussions of Soviet force integration. Colonel M. Skovordkin's article "Some Questions on Coordination of Branches of Armed Forces in Major Operations," (Military Thought, No. 2, 1967) provides some exceptional insights into the strategic and operational planning of force integration with emphasis on the close coordination of nuclear strikes by varied Soviet forces against enemy (nuclear and non-nuclear) formations. The Basic Principles of Operational Art and Tactics by Colonel V.Ye. Savkin places integration within a broader discussion of Soviet

military operational art, and provides excellent background information on the rationale for employing force integration on the modern battlefield. Another valuable source is the 1980 series on force integration which appears in the Soviet military publication Voennyi Vestnik (Military Herald). This group of articles explores a number of significant aspects of the integration concept, with particular emphasis on some of the problems Soviet force commanders confront in organizing effective integration. One final source, which appears to have escaped notice in the West, is G.A. Zubarev's work Integration of the Forces in Combined-Arms Battle (Moscow); his is an excellent study of integration as it is envisaged for use in offensive, defensive and meeting engagements. Particularly useful for its detail on the myriad problems which the Soviet commander may encounter in conducting an integrated operation, this source explores the concept of integration at both the operational and tactical levels.

Primary Soviet sources in the original Russian comprised a sizeable portion of the data base exploited for this study. Soviet military literature, untranslated at the time of this report's writing, provided invaluable insight on the Soviet practice of force integration. Useful quotations extracted from these primary sources were translated by the study team and referenced accordingly in the endnote sections. In some cases, to improve the readability of a passage translated from the Russian, additional transition words or phrases have been inserted into the English version. Such additions are set off from the text in brackets in an effort to provide concise, unadulterated versions of the original Russian. However, in an effort to

remain faithful to the full, intended meaning of the Russian author, the study team has attempted to limit the insertion of such fillers whenever possible.

Russian terminology used in the study has been transliterated according to the system utilized by the Library of Congress. Where Soviet military nomenclature appears in the text in Russian, its use was necessitated by the absence of an English language equivalent. Though the use of Russian military terminology is quite standard in Western analyses of Soviet military affairs, the following clarification of several selected terms is provided for the reader.[1] It should be noted that these terms refer to organizational units which are present in ground, air, and naval forces.

- Obedinenie refers to a major Soviet field force such as a Front or an Army. It may be formed from any of the service branches (or arms) to conduct major military operations.

- Soedinenie refers to a corps, division or brigade level equivalent unit. The unit may be formed from a single branch or various branches including naval squadrons. Occasionally it is used loosely to connote an army.

- Chast' designates any unit of regimental size or smaller which is administratively self-contained and separately numbered.

- Podrazdelenie is the Soviet term for "subdivision," referring to a subordinate unit of a chast'. It is not separately numbered but has a permanent organization, e.g., a squadron or battalion.

[1] These specific terms are described in the editor's comments to Col. V. Ye. Savkin's work The Basic Principles of Operational Art and Tactics. (A Soviet View). (Moscow: 1972.) (Washington, D.C.: U.S. Government Printing Office, trans. and published under the auspices of the USAF, n.d.), p. viii. See, also, the U.S. Air Force Dictionary of Basic Military Terms for additional clarification of Soviet military terminology.

CHAPTER I

FORCE INTEGRATION: A MAJOR COMPONENT OF SOVIET OPERATIONAL ART

1. THE RAISON D'ETRE FOR SOVIET FORCE INTEGRATION.

Force integration is practiced by the Soviet military to achieve several important objectives of which the primary is, naturally, the attainment of military victory. To achieve this ultimate goal, Soviet military strategy regards the decisive and swift annihilation of the enemy's most powerful and lethal assets as both extremely urgent and critical. Colonel A.A. Sidorenko's commentary, from his well-known work The Offensive, attests to the far-reaching significance of this requirement in contemporary warfare.

> "The presence of nuclear weapons in the [enemy's] inventory and the numerous means for their delivery to the target have put forth one of the most important missions of contemporary combat—the combating of these weapons... . It is completely obvious that the successful conduct of the offensive is unthinkable without the timely and dependable neutralization and destruction of these means."[1]

In a Soviet-U.S. engagement, those assets which the Soviets rank as high priority targets most certainly include the U.S. theater nuclear force (TNF). Soviet military authors consistently stress the TNF and all assets associated with its employment (e.g. launchers, launch sites, air bases, ammunition storage sites, and communication points) as

targets for immediate destruction should a Central European military conflict ensue. Thus, as V.D. Sokolovskiy writes in Military Strategy:

> "The primary objectives of armed combat in the theaters will be the nuclear weapons of the enemy. Without eliminating or neutralizing these nuclear weapons it is impossible to count on successful conduct of any military operations, offensive or defensive, in the theaters."[2]

Colonel Sidorenko subsequently reaffirms this prioritization of the TNF and its ammunition as critical targets:

> "... the battle against [the enemy's] means of nuclear attack is conducted continuously. These means are destroyed immediately wherever they may be—in assembly areas, on the march, and at firing and launch positions. Along with the means for employing nuclear weapons, nuclear ammunition is also destroyed without delay at any place that it is discovered—during transportation, at warehouses, and at places for assembly, filling, and storage."[3]

Because of the priority the Soviets attach to the destruction of the TNF and its associated assets, they are consequently prepared to employ all necessary assets to achieve this primary objective. As Sidorenko succinctly states, "combating enemy tactical means of nuclear attack is one of the most important missions of destruction by fire. Its successful accomplishment can be attained only by the combined use of available forces and means."[4] (Emphasis added.)

To do so, however, requires extensive, coordinated planning on the part of the various branches of the armed forces designated for use in such a combined-arms mission. This consideration, therefore, is the major overriding factor that motivates the Soviet practice of force integration. To achieve the timely and decisive destruction of the enemy's TNF, well-planned and well-executed integration of all assets employed is obviously crucial. Hence, as the authors of the 1980 work Artillery in Battle and Operation (Artilleriia v boiu i operatsii) note,

> "Soviet military science...recommends that the various types of forces not be employed in an uncoordinated fashion, but rather in an integrated manner in accordance with their intended use and military capabilities based on concrete operational-tactical plans. Coordination in timing and in [delimiting] areas for launching strikes between all the forces and assets which participate in an operation—in essence, integration,—is one of the primary conditions required for achieving victory over the enemy."[5]
> (Emphasis added.)

Marshal N.V. Ogarkov, the USSR's First Deputy Minister of Defense, perhaps provides an even more definitive statement regarding the important place of force integration in Soviet military strategy:

> "Achievement of the goals of all... operations, as well as the attainment of victory in war generally, is possible only [by employing] the united strengths of all branches and types of the armed forces. Hence, the

> organization and maintenance of close and constant integration in war and in strategic operations is considered one of the most important principles of Soviet military strategy."[6] (Emphasis added.)

From a theoretical standpoint integration is, thus, a means to an important end—the achievement of military victory which itself is attained in the first instance by neutralizing the destructive capabilities of the enemy's theater nuclear force. Moreover, well-coordinated integration of the armed forces maximizes the potential for realizing an optimum correlation of forces to the advantage of the Soviet military—another essential ingredient for the achievement of ultimate military victory from the Soviet perspective.

Well-designed and executed force integration also enhances other fundamental operational-tactical requirements which must be met under contemporary warfare conditions. In theory, integration upgrades the timely flow of intelligence from reconnaissance assets (for target acquisition) to those forces responsible for the destruction of enemy targets; it also provides the commander a certain degree of flexibility in refurbishing forces at any level of organization which have been attrited by enemy strikes. Moreover, by virtue of coordinated planning, integration limits any nonessential overlapping of target assignments among the forces, thereby allowing for a more economical employment of friendly assets against enemy targets.

General factors such as these, therefore, guide the Soviet military in its belief that force integration is crucial to the realization of their primary military objectives. The following section explores the concept

of force integration in greater detail in an effort to more fully grasp the significance which the Soviets attach to it as a major component of operational art.

2. SOVIET FORCE INTEGRATION: ITS DEFINITION, GENERAL APPLICATIONS AND RELATIONSHIP TO OTHER SOVIET PRINCIPLES OF WAR.

2.1 DEFINING THE CONCEPT OF FORCE INTEGRATION.

Force integration—which is also frequently referred to or translated as "force coordination," "interworking," "concerted actions," or "cooperation"—is defined both generally and specifically by the Soviets. In its officially accepted, general definition from the Soviet Military Encyclopedia, force integration (vzaimodeistvie) is understood as:

> "... one of the principles of [Soviet] military art... coordinated [or organized] by mission, axis, border and time for [the conduct of] operations by [between/among] the podrazdeleniia, chasti, soedineniia, and obedineniia of the various branches of the armed forces, ... the navy, and specially designated forces in support of a common battle and operational objective."[7]

Defined broadly, integration can thus be viewed as a mechanism or process utilized by the forces and their commanders in the preparation and conduct of military operations with the aim of contributing to and ultimately achieving complete military victory. In other words,"the overriding objective of coordination [integration] is not [only] the creation of favorable conditions for actions by any particular branch of the armed forces, but the coordinated destruction of the enemy."[8] (Emphasis added.)

The concept of force integration is, however, considerably more complex than is depicted on the previous page in the "standard" Soviet definition. In fact, efforts to fully define integration become quite complicated due to the nature and scope of the designated applications for integration (e.g. at the strategic, operational, and tactical levels and between the myriad, possible combinations of force elements). The definitional process is also difficult because of the seeming inability of most Soviet military authors to provide clear, consistent and precise definitions of its many and varied functions. Moreover, though Western military thought employs much of the same standard military terminology as used by the Soviets, definitional nuances and shadings in meaning naturally exist for each side. Consequently, this impedes attempts to gain a clear appreciation of the Soviet force integration concept. Hence, when analyzing the more specific Soviet definitional discussions of force integration, Western analysts must be prepared to scrutinize and dissect each discussion carefully and critically, with a wary eye continually open to the possible pitfalls of "mind-sets," misperceptions, misinformation and the like.

As alluded to above, the Soviet military views integration in terms of its strategic, operational and tactical applications. In contemporary warfare, these distinctions are particularly critical; each delineates specific goals for and approaches to integration on the modern nuclear battlefield. Conceptually, the planning, organization, and execution of integration flows top to bottom—from strategic through operational to tactical. (See Figure 1.1)

During peacetime and in a pre-H-hour period of rising tensions, a downward flow of integration control would be generally maintained; in time of war, however, needs would

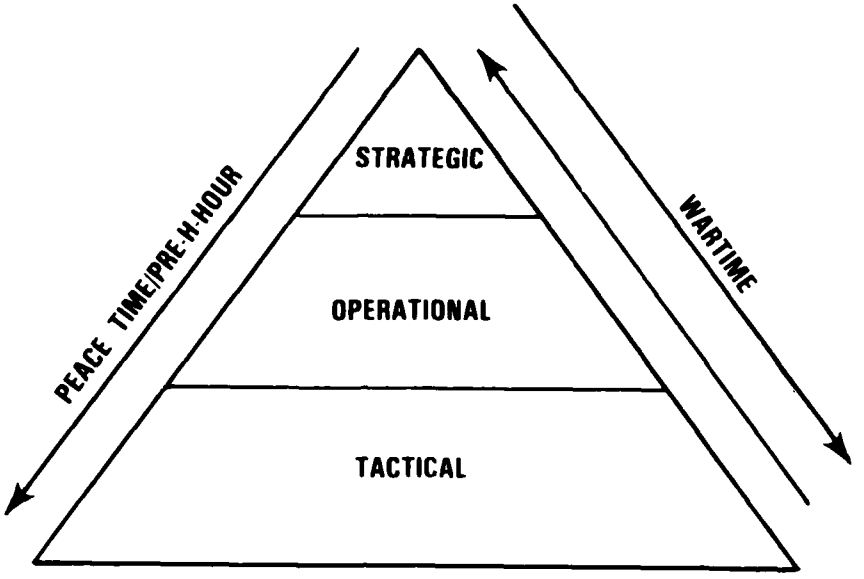


FIGURE 1.1
Conceptual Framework of Soviet Force Integration

rapidly arise for the modification and/or restatement of integration based on the on-going development of events at each of the three levels. In essence, the advent of wartime would bring a dual flow in the organization, execution, and maintenance of integration as a method of consistently optimizing both the correlation of forces and the opportunity for achieving military victory.

The following sections further explore the inter-relationship between strategic, operational and tactical integration, focusing on its form and goals as employed in a theater nuclear warfare context.

2.1.1 Force Integration at the Strategic Level. On the strategic level, force integration implies the coordinated employment of large groups of friendly forces in several theaters of military operations (TVDS), in one [such] theater, or

on one specific strategic axis with the objective of successfully conducting a strategic operation, campaign, or war.[9] Sokolovskiy provides further clarification on the nature of the strategic operation and the role which integration plays in it:

> "Each type of strategic operation, strike, or operation of any service of the armed forces is conducted jointly. Independent operations, strictly speaking, by operational units or services of the armed forces as a whole do not exist. A future war can be conducted successfully only when all strategic operations are strictly correlated [integrated] on the basis of a single strategic plan with united centralized command and if they are purposefully aimed at solving the general problems of armed combat. Such coordination of operations by the services of the armed forces in a future nuclear rocket war will be accomplished in the form of strategic operations. The strategy of cooperation is a specific form of strategy."[10]

Thus, integration is an essential component part of Soviet military strategy by virtue of its important supporting function in the coordination and conduct of strategic operations. (Sokolovskiy's comment also highlights another aspect of force integration—namely, centralization—which will be discussed more fully in a subsequent section regarding its significance in the organization and conduct of force integration.)

Strategic force integration, based on the preceding definition, can therefore be viewed as a process supervised by senior Soviet military planners at the Supreme Command

and General Staff levels; it is facilitated by the actions of subordinate commanders and their forces who are charged with the execution of portions of this single, unified strategic plan.

Each branch of the armed forces participating in the strategic operation is responsible for fulfilling its own missions in support of this plan, and for conducting coordination with the other branches of the military that have been designated for use in the operation. In relation to contemporary conditions of war, this requirement entails:

> "...strategic coordination between major units of branches of the armed forces ... [through] the coordination of their efforts during accomplishment of common strategic missions. The organization [of strategic integration] consists of, firstly, the coordination of efforts of all other branches of armed forces with nuclear attacks of strategic rocket troops and, secondly, in the coordination of operations of ground troops, air forces, the navy, and combat actions of PVO Strany troops [air defense] among themselves. It provides for coordination in actions of strategic groupings of branches of armed forces primarily in regard to the objective and to a lesser degree in regard to time and place."[11]

Hence, force integration at the strategic level supports large-scale operations with greater emphasis on mission objectives than on the timing and actual placement of force elements within a particular theater. As discussed later in this chapter, these latter two considerations receive greater emphasis at both the operational and tactical levels, where their addressal is more important to the respective command echelon missions.

Strategic force integration appears to be a relatively new concept for the Soviets. This may partially explain the lack of clarity and detail found in their disucssions of this particular level of integration. The relative sensitivity of the issue may also reduce the availability of unclassified discussions on it. However, the advent of nuclear weapons and their attendant implications for the modern-day battlefield have certainty cast integration (generally) and strategic integration (specifically) in a new light for the Soviets. Contemporary nuclear warfare, from a strategic perspective, necessitates the accomplishment of a broad array of tasks under extremely fluid and rapidly changing conditions. The majority of these tasks can be achieved only through the carefully integrated efforts of all military forces. As Colonel Skovorodkin indicates in his excellent article "Some Questions on Coordination of Branches of Armed Forces in Major Operations," contemporary integration requires greater precision and skill at all levels of application:

> "The simultaneous defeat of the enemy along the entire depth of his dispositions, the fluidity of combat actions, the high tempos of advance, and the actions of troops along axes without, as a rule, close lateral contact between them sharply increases the importance for precise coordination in the application of troops and equipment by the branches of the armed forces... . On the strength of what has been stated, carefully organized and continuously maintained coordination now has even more influence on the course and outcome of operations than formerly." [12]
> (Emphasis added.)

In sum, force integration for accomplishing strategic objectives provides a general framework and guidelines for the development of integration at the operational and tactical levels. As a consequence, it is a decisive factor in determining the appropriate allocation and mix of forces and equipment required to meet the demands of a fluid and rapid theater nuclear engagement.

2.1.2 Force Integration at the Operational Level. According to the Soviet Military Encyclopedia, operational force integration consists of coordinated actions by the subordinate obedineniia and soedineniia of the branches and other types of forces in an operation conducted on one or more contiguous axes. Naturally, correct timing and the well-coordinated placement of the forces within the theater(s) are integral to the proper functioning of integration at this level. Singly and jointly, commanders are to determine how to coordinate (nuclear) strikes against enemy targets, and subsequently how to best exploit the results of these strikes.[13] The commanders are also tasked with determining how to synchronize their operation(s) with those of other force elements in adjacent area(s) according to time, direction(s) for launching the planned strikes (both conventional and nuclear), and with the assignment of specific targets to particular force elements.[14]

In essence, operational integration therefore consists of a set of activities which are to occur under a central, unified strategic plan. The activities are developed according to the general directives of the Supreme Command and the General Staff on implementing force integration. Depending on the particular requirements of this general plan, inter-service and/or intra-service integration is organized between all forces engaged in the overall operation.

Specific roles are assigned to each type of force and/or branch of service depending on which force capabilities appear to be best suited for achieving the common military objective. In this way, a sub-strata of individual commanders responsible for individual operations are united by a common goal and purpose. Assets are allocated to achieve the timely realization of military objectives, with certain operations receiving priority allocations of forces and equipment when their success is deemed especially critical to attaining the objectives of the overall strategic plan. Skovorodkin provides further commentary regarding the organization of integration at the operational level, and speaks specifically about the various methods by which combat operations are constructed in the interests of supporting integration.

> "The organization of coordination [integration] begins during formulation of the decision on the operation. The main thing in it is the correct determination of objectives and tasks for major units in the branches of the armed forces and the coordination of the procedure for their attainment or fulfillment. The process of organization continues during the working out of the operational plan and plans for the combat employment of branches of the armed forces as well as during assignment of missions to the troops. In a large scale operation which itself consists of a system of operations on a lesser scale, the coordination of obedineniia and soedineniia of branches of the armed forces can be organized in stages (common operational missions), and within them according to the most important

> individual missions which, in distinction from common operational missions,... can be called specific missions (some of [which] have the greatest significance)."[15]

Integration at the operational level (and, as is shown in the following section, even more so at the tactical level) is a process for organizing and conducting combined-arms operations aimed at defeating the enemy, for protecting friendly forces, and for providing mutual support to adjacent assets in a theater. At the operational level, integration entails close monitoring of events as they unfold during battle, with emphasis on the status and activities of friendly forces and especially on the disposition of enemy forces throughout the theater(s) of operation.[16]

Based on the strategic plan for integration, operational level force commanders decide upon the distribution of specific assignments among the types and branches of the forces (ground, air, and/or naval) participating in the operation(s). Moreover, both prior to and during the operation(s), they are responsible for:

> "... clarifying the means for achieving [conducting] the military activities; organizing mutual [warning] signals for the staffs and troops (regarding the air enemy, radioactive, chemical, and biological contamination); determining the order for contacts [communications] between the integrated forces; establishing a unified system of signals in accordance with the directives of the superior command or on their own initiative; and, when organizing an operation using only conventional weapons, [establishing] measures

for integration for the transition to the use of nuclear weapons and for the order [progression] of military activities during their use."[17]

The main "actors" responsible for effecting and coordinating integration at the operational (and tactical) level are the military command staffs (Front, Army, and Naval).[18] Based on continual discussions with the theater commanders and knowledge of their own mission and the missions of neighboring forces, these staffs support integration by: maintaining open lines of communication; clarifying the order-of-battle based on the progression of events during battle; establishing on-going, mutual exchanges of information among themselves, with other forces, and with their commanders; and, finally, by assisting in the development of new integrated operational plans for review and approval by the superior command.[19]

When this set of activities supports theater nuclear operations, it is guided by several important rules and considerations; the staff elements (and subordinate line commanders) are instructed to keep these constantly in mind when fulfilling their tasking in support of integration. The rules include the following:

- Troop coordination is executed primarily to achieve maximum results from nuclear strikes against the enemy.

- Integration [interworking] of conventional forces and weapons should be organized so that combat missions are performed primarily by combined arms podrazdeleniia, chasti, and soedineniia.

- Coordination of efforts must include an assessment of the combat capabilities and weaknesses of all chasti and podrazdeleniia participating in battle.

- Integration [interworking] must be based on mutual assistance and interchangeability of combat arms and special troop podrazdeleniia and chasti, and also of adjacent units to ensure the success of combat missions assigned them.[20]

Successful integration requires flexibility (including plans for the interchangeability of units), creativity, and precise execution.[21] Participants in the integration process are held responsible for knowledge of the principles of war generally, and the rules of integration specifically. Thus, as several Soviet authors suggest, only be adhering to all of the above guidelines can pre-planned integration be initially implemented and subsequently modified to meet the ever-changing requirements of the theater nuclear battlefield.

2.1.3 Force Integration at the Tactical Level. Tactical integration is defined as the combination of strikes and maneuvers of soedineniia, chasti, podrazdeleniia, and [naval] crews participating in combined-arms operations (ground, sea, and air).[22] In essence, it is a sub-set of both operational and strategic integration and comprises the lowest level of application for integration between all force elements in the theater(s). The principles for achieving tactical integration grow out of those enumerated for the two higher levels. Drawing on the broad objectives

of integration at those levels, the principles for the tactical application of integration become extremely specific in nature, scope, and content. Moreover, they are directly intertwined with the characteristics of the tactical theater environment. Each of these main principles are considered below.

First, as at the strategic and operational levels, the organization of tactical force integration is driven by the primary goals of striking the enemy's nuclear assets and optimally exploiting the results of any friendly nuclear strikes. General issues to be resolved for successful tactical integration therefore include such concerns as determining the appropriate nuclear weapons yield and the number of nuclear weapons to employ; selecting the time and place to strike; and selecting appropriate friendly assets to most effectively exploit the results of the strikes.[23] The on-going resolution of these issues reflects the systematic and continuous nature of integration as a process.

Second, the subordinate tactical staffs organize integration, as at the two higher levels, according to specific missions, boundaries of the operation(s), and timing. The staffs are responsible for monitoring the step-by-step progression of the tactical operation(s), paying close attention to the possible need for repositioning the troops, adjusting weapons for targeting (or retargeting), relocating tactical control points, and refurbishing units (podrazdeleniia, chasti, etc.) that have been attrited.[24]

Third, maximum emphasis is placed on selecting the tactical force elements best suited for fulfilling each specific mission--in essence, on achieving a "natural"

distribution of targets among the strike forces. This is based on the capabilities of each force and is also determined by assessing the factors of time, terrain, weather conditions, and the enemy's own specific strengths and vulnerabilities within the tactical environment.[25] Maj. Gen. (Aviation) S. Sokolov provides an excellent illustration of what this principle entails in organizing tactical coordination between aviation and rocket forces:

> "It is known that modern tactical aviation can deliver, together with rocket troops, a large amount of nuclear ammunition to the targets. The use of nuclear weapons to perform, relatively independently, major assignments in the interests of the operation as a whole, involving the destruction of a portion of the forces of an enemy formation (ground troops, aviation, or others) and the destruction of enemy rockets and nuclear weapons. The organization of coordination between tactical aviation and ground troops requires, above all, the proper distribution of assignments (targets) among aviation and rocket troops. Taking into consideration the combat characteristics and capabilities of aviation, ... it is expedient to use it to strike small, mobile, newly discovered, and rapidly moving enemy targets. The main targets for fighter-bombers may be launchers and missiles of various types, cruise missiles at their sites, aircraft on airfields,... enemy airborne and amphibious landings... and many other targets. Ground troops must

in turn carry out many assignments which ensure the success of the combat operations of tactical aviation. These include combating enemy aircraft and guided missiles, neutralizing and destroying enemy air defense facilities (mainly radiotechnical equipment and aviation control systems) within the operational area of one's own air force, rendering assistance in securing bases for tactical aviation, particularly where ground troops are advancing rapidly."[26] (Emphasis added.)

Another example, provided by Rear Admiral G. Kostev, attests to the importance of considering time, terrain, and other theater-dependent variables as well as the specific capabilities of each force asset. Writing on tactical cooperation (integration) between ships and aircraft, he states:

"Tactical cooperation is organized with due consideration of the combat characteristics of the weapons and equipment, the conditions of their use (time of day, weather, military-geographic specifics of the battle area) and the training level of the crews of the ships and aircraft which are to take part in fulfilling the assigned mission. Well-organized cooperation makes it possible for heterogeneous forces to attack the enemy from different directions using different weapons and, at the same time, to prevent his evading the blows. As a result the enemy sustains heavy losses with minimum losses by the attacker."[27]

Fourth, tactical integration relies heavily on the ability of units to mutually support each other and to retain flexibility in conducting joint operations.[28] (In essence, a certain degree of force substitutability is desired—an aspect of force integration which is more fully discussed in Chapter II.) Consequently, as G.A. Zubarev remarks in his work on operational-tactical force integration in combined-arms operations:

> "In organizing and, especially, in achieving integration between the force elements, it is very important to determine what type(s) of mutual assistance each can provide in instances where there are drastic changes in the military situation, and [to decide] which troops and assets can be set aside for this purpose."[29]

Finally, uninterrupted combat activity—continuity of the battle—is extremely important for successful integration at all levels and particularly for success at the tactical and operational levels. The Soviets regard continuity in combat as an ingredient essential to the maintenance of force integration. Gaps in time (e.g., in delivering joint strikes) and space (e.g., when friendly units lose contact with one another) not only degrade integration but significantly impede or negate the attainment of victory in the theater(s).

The previous discussion has addressed many of the key issues associated with the Soviet concept of tactical integration.

It is therefore useful to summarize the sequence of actions to be taken by a tactical commander and his staff in organizing that integration. The following graphic

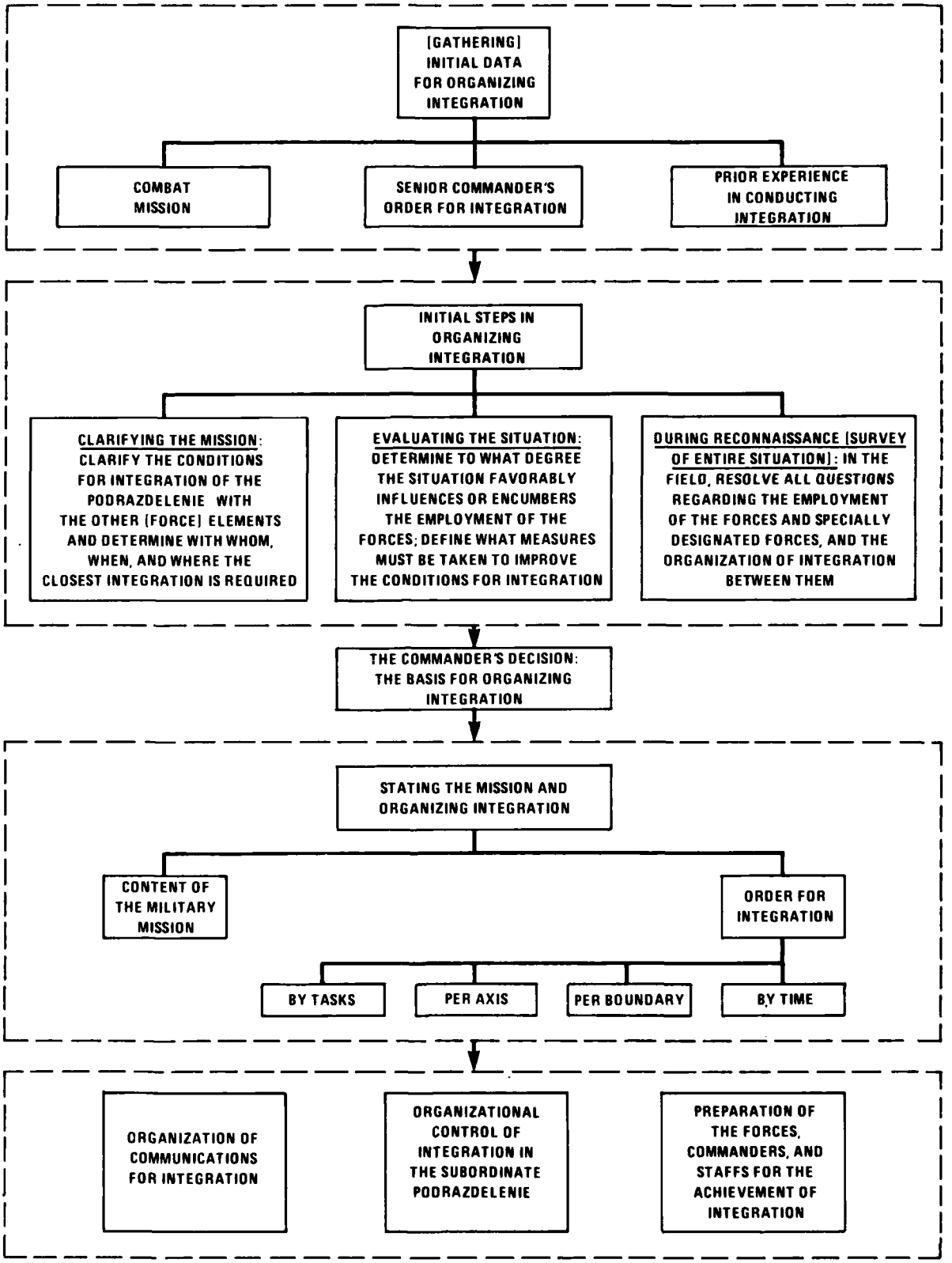
presentation (Figure 1.2) illustrates this step-by-step process, delineating the various issues which a commander is expected to resolve to achieve effective force integration. It should be noted that while the figure addresses the ideal flow of actions in applying integration at the tactical level, the majority of general steps and broad issues considered also are reflected at both the operational and strategic levels.

3. FORCE INTEGRATION: ONE OF THE CENTRAL PRINCIPLES OF SOVIET MILITARY ART.

The level of importance which the Soviets attach to force integration may be understood more completely by reviewing its relationship with the other six principles of Soviet military art. These principles provide general guidelines for the creative execution of specific battlefield activities. (See Table 1.1 for a description of the main principles and their primary objectives.) In essence, they serve as the:

> "...basic ideas and most important recommendations for the organization and conduct of a battle, an operation, or a war as a whole. The principles of military art are not some isolated theoretical theses, but central, basic generalizations suitable for practical application in all the basic forms of troop combat activity and encompassing fundamental directions of the possible manifestations of military art which determine success in a battle or operation."[30]

Each of the seven basic principles requires systematic and rational application based on the particular requirements of a combat situation. Moreover, Soviet



*G.A. Zubarev, Integration of Forces in Combined-Arms Battle (Moscow, 1965), pp. 34-35.

FIGURE 1.2
Sequential Resolution of Questions Regarding Integration*

TABLE 1.1
Soviet Principles of Military Art*

PRINCIPLES OF MILITARY ART	PRIMARY OBJECTIVE(s)
1. Mobility and High Tempo of Combat Operations	To achieve and sustain rapid combat force movement for rapid mission accomplishment.
2. Concentration of Efforts	To achieve superiority by massive fire; to create breaches for breakthrough operations, etc.
3. Surprise	To attain rapid and complete victory by surprising the enemy, thereby inflicting heavy enemy losses and minimizing friendly force attrition.
4. Combat Activeness	To seize and maintain combat initiative and reduce the likelihood of successful enemy breakthrough operations.
5. Preservation of Combat Effectiveness	To reduce the loss of personnel and equipment, enabling pursuit of combat objectives; to effectively allocate and reallocate units within the order of battle.
6. Conformity of Goal(s)	To assure that military objective(s) conform to the actual battlefield situation based on asset availability, enemy capabilities, etc.
7. Integration	To assure the success of combined arms operations.

*Adapted from Soviet Army Operations, pp. 1-6, 1-9 and other selected research materials used in the preparation of this study. See also Savkin, p. 165.

authors suggest that the principles cannot be viewed in isolation or utilized in a disjointed fashion. Such an approach would disregard the important inter-relationship which exists between them. As Colonel Savkin stresses:

> "The principles of military art... must be taken together and use made of those and to the degree which the situation necessitates. Each principle is an individual link in the overall chain. To achieve success requires the skillful use of the entire chain or complex of principles which ensure fulfillment of combat missions in a specific situation."[31] (Emphasis added.)

It is clear from this discussion that the concept of force integration supports the effective application of the other six principles, and vice versa. In essence, a mutually-supportive, yet mutually-dependent relationship exists between the seven. In conclusion, it is therefore inappropriate to attach a higher or lower general significance to integration compared to the other principles of Soviet operational art. However, as is demonstrated in subsequent sections of this report, a failure to integrate forces could greatly jeopardize the success of a particular operation and affect the viability of the other six principles as well.

CHAPTER II

SOVIET FORCE INTEGRATION: THE CONCEPT IN ACTION

1. INTRODUCTION: THE EVOLUTION AND ROLE OF INTEGRATION IN THE NUCLEAR ERA.

The Soviets have practiced the general concept of force integration throughout the twentieth century beginning with limited application in World War I and later, more extensive involvement during World War II. Particularly in the latter conflict—in engagements such as the Battle of Kursk (1943) and the Manchurian Campaign (1945)—the Soviets acknowledged the fundamental significance of force integration as a means for achieving success in combined-arms, multi-front conventional operations.[1] (See Figure 2.1 on the use of force integration in these two large-scale operations.) As Colonel Savkin notes:

> "The organization of interworking [integration] received considerable development in the course of the Great Patriotic War [WWII]. ... In the course of the war the depth of organization of interworking rose. At the war's beginning it was arranged to the depth of the immediate mission. An increase in range of means of suppression, a growth in the number of tanks and aircraft, and the need to commit mobile soedineniia to a break-through required the organization of inter-working to a great depth. In the period 1944-1945 it usually was organized to the entire depth of the mission of the corps or division."[2]

CAMPAIGN	KURSK*	MANCHURIA**
● Dates:	July-August 1943	August 1945
● Integration:	Ground/air: defense/offensive	Ground/air/naval:offensive
- Ground missions:	- Deliberate defense followed by counter-offensive	- Swift offensive followed by exploitation
- Air missions:	- Gain air supremacy, disrupt enemy communication.	- Maintain existing air supremacy
- Naval missions:	- None	- Assist in isolating ground forces from reinforcement
● Forces:	[illegible] Fronts (including air armies), [illegible] corps, partisan [illegible]	3 Fronts (including air armies), Pacific Fleet (including submarines, seaborne landing forces), airborne unit.
● Key Decision-Makers (Strategic):	Stalin; Chief of the General Staff (Vasilevsky); Deputy Chief of the General Staff (Antonov); GHQ; Deputy Supreme Commander-in-Chief (Zhukov). (Front commanders were consulted.	Stalin (preeminent role including adjustments to Army operational plans); Commander-in-Chief of the Soviet Far East forces (Vasilevsky); the General Staff; GHQ. (Front commanders worked out front plans for adjustment and approval based on the approved General Staff plan.
● Comments	"...the decisive role in drawing up this (Soviet) plan was played by the senior strategy-directing bodies and not by other command echelons." Marshal Vasilevsky (p. 73)	"...the Party and the Government vested great powers in the Commander-in-Chief..." (of Soviet forces in the Far East) to maintain effective coordination among the fronts. General of the Army Shtemenko (p. 339)

* All of above based on A. Vasilevsky, "Strategic Planning of the Battle of Kursk," in The Battle of Kursk (Moscow: Progress Publishers, 1976), pp. 59-76.

** All of above taken from Gen. S.M. Shtemenko, The Soviet General Staff at War. 1941-1945. (Moscow: Progress Publishers, 1970), pp. 315-353.

FIGURE 2.1
Soviet Force Integration: Examples From World War II

Based on the cumulative experience gained from successive WWII battles, the breadth of integration's application grew—ultimately forming an experiential base which the Soviets use today in viewing integration as a major and important principle of military art.

However, as alluded to by Savkin in the statement above, qualitative and quantitative changes in weaponry have served to spur the continued development and evolutionary application of the force integration concept. Such changes—both during World War II and after—have required the Soviet military to modify operational concepts apace with weapons developments. Soviet military thought reflects these important interrelationships:

> "Weapons are one of the most important and decisive fundamentals of development of military art. They have a substantial influence on methods of conducting military operations and war as a whole. The appearance of new types of weapons increases the combat effectiveness of armed forces, opens up opportunities for accomplishing new and more complex tactical, operational, and strategic missions and thus involves a change in methods of conducting the battle, operation, and war as a whole. Significant changes in means of warfare invariably give rise also to major changes in methods of conducting operations and battles."[3] (Emphasis added.)

It is therefore obvious that the appearance of nuclear weapons—characterized by the Soviets as causing a dramatic change in military thought—had a substantial impact on the concept of force integration as well as on the entire

Soviet approach to warfighting. The latter point is made consistently and repeatedly by Soviet military thinkers. In Sidorenko's view: "The rapid development and mass introduction of nuclear weapons, [and] missiles... [has] led to fundamental changes in the nature and methods of military actions and to a genuine revolution in military affairs."[4] This view is reinforced by the perspective of S.G. Gorshkov, Admiral of the Soviet Navy:

> "Scientific-technical progress in the military sphere has given rise to new criteria for defining the real military strength of each type of military force, the primary [area of progress] being the ability to more rationally utilize that most decisive means for waging war—the nuclear rocket."[5]

Finally, as Soviet military scholar G.A. Zubarev has written regarding the impact of nuclear weapons on the development of force integration:

> "The application of new means of combat and new, more advanced military technology always leads to a real change in the character of and methods for military activity by the [armed] forces and integration between them. As the experience of the last wars illustrate, the influence of the development of weapons and military technology, changes in the organizational structure of the troops, and the methods and means for conducting military operations [all] have caused the character of integration to develop uninterruptedly, improve, and become more complicated. The

appearance of nuclear weapons has had a significant impact on integration—[a concept] which has become a most decisive factor in the organization of any type of battle."[6] (Emphasis added.)

Nuclear weapons have, in essence, "radically changed our [Soviet] ideas about the aims of military actions as well as about the methods and means used to attain them. [They] have also made it necessary to formulate and resolve the problems of coordinating branches of the armed forces in a new manner."[7] Consequently force integration, in a contemporary theater nuclear context, is geared to "coordination between forces carrying out the operation... in the use of nuclear weapons and ... in the use of their results;" ... in general, creating "... a new situation determining the basic make-up of modern coordination of all branches of the armed forces."[8]

The following section assesses these general observations in greater detail, emphasizing the attainment of force integration goals in a theater nuclear context.

2. FORCE INTEGRATION IN CONTEMPORARY THEATER WARFARE.

Force integration in the pre-nuclear era was essentially less complicated for the Soviets to plan and conduct than it is today.[9] The requirements and characteristics of the nuclear battlefield (reviewed in the previous section) have dramatically influenced the specific nature and application of contemporary Soviet force integration. This section provides a thematic discussion of this influence. Organizationally, the subjects of air-ground, naval-ground, and naval-air combined-arms offensive and defensive operations are discussed together, grouped under major themes relevant to the conduct of all three

types of joint operations. These themes include issues such as the attainment of mutually supportive target assignments; force substitutability and asset replacement; and centralized planning and organization. Each is a major area of concern to the Soviets for the attainment of military victory.

2.1 INTEGRATION OF FRIENDLY TARGET ACQUISITION, MUTUALLY SUPPORTIVE TARGET ASSIGNMENTS, AND TARGET DESTRUCTION.

A useful method for describing this particular aspect of integration involves examining the contemporary relationship between Soviet air and ground forces. This relationship demonstrates the overriding importance of coordinated target assignments, acquisition and destruction. In practice, this relationship can be viewed as an essential and compatible "division of labor" between ground and air forces. In the words of Major General (of Aviation) Sokolov:

> "The use of tactical aviation and the nature of its tasks have changed considerably since the equipment of ground troops with operational-tactical rockets capable of striking at troop formations and targets deep within the enemy rear. ... Each of these combat weapons has its positive qualities; ... aircraft have high maneuverability, while rockets have great speed of flight and, consequently, the ability to reach the target within a short period of time. For this reason, in modern ground troop operations, rockets and tactical aviation operate not as rivals, but as allies, supplementing and reinforcing one another."[10]

Coordinated operations are therefore integrated to exploit available air and ground (rocket) force strengths and weaknesses.

Coordinated action between aviation and other conventional ground force components also receives considerable attention in the Soviet literature. This is true primarily because of the importance attached to the use of conventional ground forces in exploiting the results of friendly nuclear strikes against enemy targets. Moreover, this is a mutually supporting relationship. A failure by the friendly air and rocket strike forces to annihilate enemy strike systems which threaten friendly ground formations impinges on their subsequent ability to exploit the results of friendly nuclear strikes. Timely reconnaissance data is also required by the ground forces in their efforts to neutralize targets located close to the FEBA, and aviation plays a key role in developing this intelligence. The ground forces thus depend heavily on aviation and missiles for defense as well as offensive support. The following passages from an article entitled, "Coordination Between Aviation and Tanks," clearly illustrate a particular example of this synchronization of targets and mission responsibilities:

> "A new mission requiring coordination of efforts of tank forces and aviation is the constant battle against nuclear missile means of the enemy, which will be well concealed, reliably protected by PVO [air defense] forces and will frequently be moving. ... Aviation, of course, has the greatest capability to combat nuclear missiles. Its chief merit lies in the ability

> to independently reconnoiter and simultaneously immediately destroy, even using conventional fire means, any operational nuclear missile means, including those on the move. ... Tank forces, in their turn, can assist aviation by considerably easing its battle against a certain portion of the enemy PVO forces and means in the zone of advance to the depth of the range of its means of destruction. With missiles, long-range artillery and swift strikes, tank groupings can destroy anti-aircraft batteries and battalions and points for control and guidance of aircraft and missiles. ...On the whole, joint operations of tanks and aviation will be accomplished primarily within the framework of operational coordination based on an allocation of strike objectives and a synchronization of the strike delivery time."[12]

Regarding Soviet naval cooperation with ground and air assets, less specific, though nevertheless valuable commentary is available in the unclassified data base. Sokolovskiy, writing in Military Strategy, provides a general but wide-ranging discussion of the Soviet Navy's special role of completing specific target assignments to support both its own sea operations as well as friendly air-ground operations. Describing these situations primarily from a strategic perspective, he indicates that:

> "Profound changes [are taking] place in the methods of carrying out military operations in naval theaters. ... In a future war the tasks of destroying shore targets, of defeating groupings of naval forces of an aggressor,

> his assault carrier formations and rocket-carrying submarines at bases and on the high seas, disruption of sea and ocean communications, will be accomplished by strikes of rocket troops and mobile operations of rocket-carrying submarines cooperating with rocket-carrying aircraft. ... A certain number of surface ships are also necessary to safeguard the activities of submarines and to perform secondary missions such as protection of naval communication lanes and coordination with Ground Troops in operations carried out in coast regions. ... [The increased capabilities of] submarine forces [allows them] to make nuclear rocket strikes against coastal objectives."[13]
> (Emphasis added.)

As a function of its supportive role, the Soviet Navy is also apparently expected to take on special target assignments to assist land-based troops. One Soviet author, for example, discusses the need to employ naval shore-based missile installations against enemy naval strike forces operating against friendly ground troops in coastal areas.[14] Other examples of integrated naval-ground operations highlight the navy's potential role in providing coastal defense to ground forces and in conducting amphibious assaults in support of coastal land operations. Vice Admiral V. Yakovlev, in his article "Joint Operations of the Navy and Ground Troops in Modern Warfare," provides insightful commentary on a number of missions which the Soviet Navy is likely to perform in conjunction with Soviet ground forces. Contrasting the role of the modern Soviet Navy with its functions during World War II, he writes:

"As is known, naval support of ground troops in the past was conducted with the aim of facilitating the movement of units and soedineniia along the coast, or of defending them in particular against landings or strikes by enemy surface vessels from the sea. ... It seems to us that in a nuclear war the principle forms of conducting joint naval-ground troops operations are preserved. However, the rate and depth of such operations is increased considerably, and the missions executed by the navy take on another content. Joint navy and ground forces operations in modern warfare ...can be of the nature of daily combat operations or of differing operations, for example the destruction of enemy naval forces opposing the friendly ground troops on the coast; providing amphibious landings on the coast and on islands; repulsing landings; destruction of enemy ground elements which have been surrounded and forced to the sea; securing the sea movement of troops and cargo to friendly forces operating on the coast; and disruption and destruction of enemy sea shipments."[15]

In a subsequent passage Admiral Yakovlev also comments about the joint use of Soviet naval ground and air assets in combat against enemy naval forces attacking ground targets:

"...the depth of naval support to the offensive operations of ground troops in coast areas has increased many times. ...Missile and gun surface ships, torpedo cutters and naval shore

> missile installations can be successfully used independently and in conjunction with ground troop rocket units and aviation for the destruction of enemy naval strike forces operating against ground troops in the coastal area."[16] (Emphasis added.)

It is clear from this discussion that the Soviet Navy's specific assignments in joint operations with friendly ground and aviation assets are generally intended to be supportive in nature. However, at least one Soviet author also discusses the need for applying Soviet naval assets independently against enemy ground targets when no other friendly forces are available to complete this mission. This role is discussed in the following section on force substitutability.

2.2 FORCE SUBSTITUTABILITY AND THE REPLACEMENT OF FORCE ELEMENTS: COMPONENTS OF INTEGRATION.

The factors of flexibility and creativity (discussed in Chapter I) are essential components of successful force integration. In this connection, the significance of flexibly and creatively substituting or replacing a force element for another theater asset (or assets) is also of great concern to Soviet military planners. Necessitated by many factors of modern combat—in particular, by the attrition of friendly forces in enemy strikes (thereby requiring their replacement), and by the acquisition of new, high-priority enemy targets (requiring the possible substitution of one strike asset for another because of readiness considerations)—mastery of substitutability and replacement is considered essential.

The successful conduct of force substitutability and replacement depends on a number of theater-related variables; these include the overall availability of resources in the

theater; the presence of a common understanding of prioritized missions by commanders in the theater; an understanding of the respective capabilities of each force element; effective communications to support substitutability or replacement; the rapid mobility of force elements; and finally, effective reconnaissance to both identify new targets which may necessitate the substitution of strike forces and to identify enemy assets which may target friendly forces moving into new positions. Determining the "status" of these variables depends in turn upon the effective integration (coordination) of all responsible commanders and their staffs. (This particular aspect of force integration is assessed in detail in Section 2.3 below on the planning and centralization of force integration.)

Soviet discussions of force substitutability and asset replacement focus on all of the above considerations and provide insights on the approaches to be utilized in achieving the coordinated substitution (and replacement) of friendly assets. Colonel Skovorodkin, writing on the importance of force integration within a theater nuclear context, stresses the importance of replacing units after enemy nuclear strikes:

> "An especially complicated situation can be created if the groupings of the armed forces designated for the conduct of an operation sustain major losses as a result of enemy nuclear attacks. From the command in charge of the operation and from the commanders of operational obedineniia in branches of the armed forces there is required the immediate adoption of measures for

> restoring combat capability in the soedineniia and chasti suffering the losses, for combining them into individual detachments and groups and for working out their control, for the organization of coordination, and for their comprehensive maintenance and support with the resources of superior commands. With the limited amount of personnel and equipment remaining after enemy nuclear attacks, successful continuation of an operation will depend to a decisive degree on great aggressiveness and coordination in their actions. ... All this ... [requires] redistributing efforts; clarifying or changing directions, areas, and objectives of actions; directing certain forces and resources to use the effect of actions for the success of others, insuring mutual assistance between them, restoring lost contacts and disrupted communications, etc."[17]

In another passage the author emphasizes flexibility in contingency planning for the redistribution (substitution) of friendly assets. Briefly,

> "It is desirable that the developed system of coordination [integration] take into account different versions of troop actions in order to give it vitality and flexibility. It is especially important to provide in advance for the possibility of reassigning troops and equipment in branches of forces to the accomplishment of other missions in cases where the main forces assigned to accomplish such missions are knocked out of action or will not be able to act for other reasons."[18] (Emphasis added.)

Finally, in Soviet Naval Captain Vyunenko's discussion of aviation support for ground troops, this comment related to substitutability appears:

> "Combating the enemy's navy has acquired a primary significance in the matter of supporting ground troops. Naval aircraft from carriers and land bases will be a constant threat to the troops. They will begin to show the greatest activity in support of their own troops in the development of combat operations on land following delivery by the belligerents of powerful nuclear strikes ... . [Friendly] naval aviation, having preserved its arms, will attempt to fill the gap in the ground support role which may be caused by the destruction of a significant portion of land-based aircraft."[19] (Emphasis added.)

Force substitutability and unit replacement are therefore two methods for maintaining force integration and, consequently, for ensuring the viability of the entire, coordinated theater operation(s). From the standpoint of operational-tactical mission requirements, it should also be noted that the concepts of asset replacement and substitutability for ground forces are intimately entwined with the role and function of the second echelon. In essence, resources available from the second echelon can sustain ongoing first echelon combat activities and define the outcome of an entire operation.[20]

Substitutability/replacement are essential to the conventional ground forces for another important reason. The ground formations must be capable of both regrouping and assuming new (reassigned) missions based on battlefield requirements.

such as exploiting the results of friendly nuclear strikes. Hence, as G.A. Zubarev states regarding ground operations at the operational-tactical level,

> "Should one or another podrazdelenie lose its combat capabilities, then the mission established for it by the commander may be altered. In this case—in the interests of fulfilling the common battle objective—the commander, without changing the basic plan for [and intent of] integration, redirects other podrazdeleniia for the fulfillment of [those] missions which the podrazdelenie [out of action] cannot [now] undertake. Thus, for example, when [several] artillery podrazdeleniia have lost their fighting capabilities, tank podrazdeleniia may be substituted to fulfill their (e.g. the artillery's) mission by firing from concealed positions or firing directly at an effective operating range."[21]

The organization of substitution or replacement under the fluid conditions of the contemporary battlefield relies, to a great extent, upon the establishment of pre-arranged assignments to the various forces and branches. For example, "substitutable" target assignments will have to be specified, especially when the objective is the high priority destruction of the enemy's theater nuclear force. Double-targeting may be one way by which the Soviets will seek to achieve this requirement. As one Soviet author attests, "It is most desirable to double the potential for destruction of the most important objectives using resources of either a single or various branches of the armed forces."[22] If

this approach were implemented, an enemy target could still be eliminated even though some allocated Soviet strike forces were attrited. The approach would be constrained, however, by the necessity of rationally economizing friendly assets to avoid "overkill" and to account for a target-rich environment. Effective planning and organization must therefore be conducted between the participating Soviet force elements.

This aspect of Soviet force integration--its overall planning and organization--is addressed in greater detail in the following section.

2.3 REQUIREMENTS FOR THE EFFECTIVE PLANNING AND IMPLEMENTATION OF FORCE INTEGRATION.

Force integration--from initial conception to subsequent revision--is a process, unique each time it is employed and, especially under modern conditions of war, complex and potentially vulnerable to disruption. As a consequence of its importance and in an effort to cope effectively with these "peculiarities" of integration, the Soviets insist upon the presence of several essential ingredients in its overall planning and execution. The first entails a systematic, controlled, and centralized approach. Secondly, a firm knowledge of and strict adherence to the laws of war, principles of military art, and specific requirements of integration is consistently and strongly advocated. Finally, because of integration's potentially unique character in modern warfighting, great importance is attached to the virtues of flexibility, creativity, initiative, and precision--attributes which all Soviet commanders (at all levels) should ideally possess, and which are considered essential to the effective planning and implementation of force integration. Each of these ingredients is examined more fully below.

2.3.1 Centralization and Force Integration. The contemporary requirement for precise, centralized control of integration at all levels is based on the Soviet experience in World War II. Throughout the war, the Stavka* wrestled continually with the problems of how best to coordinate complex combat activities between all participating branches of the services.

A number of innovations were consequently instituted in an effort to better allocate resources (based on force element availability and capabilities); to ensure a constant flow of information via the chain of command on the status of integration throughout the theater(s); and to strengthen the essential strategic link between all Front commanders, the Navy, and the Stavka in complicated combined-arms operations.

One significant innovation was the Stavka's creation of its own special representatives who were charged with "developing a special link between the Stavka and the Fronts."[23] Individual representatives were high-ranking military officers from the Stavka itself and from the various service branches. These special representatives were able to establish and maintain more simple, direct, and flexible contact between the Fronts, fleets, and high command. Their basic functions included:

- "Participating in the planning and preparation of strategic operations;

- Performing Stavka "oversight" to ensure the execution of its orders and directives, and regularly reporting to the Stavka on the conditions at the Front(s);

* Stavka Verkhovnogo Glavnokomandovaniia, or Supreme [High] Command.

- Providing assistance to Front commanders in preparing and conducting operations by organizing the most rational, effective use of both forces and weapons;

- Organizing and coordinating strategic and operational-strategic integration between the ground forces and the other services based on Stavka plans."[24] (Emphasis added.)

In addition to these functions, the representatives from the services had one other critical job to perform; they provided the Front commanders with authoritative advice on the appropriate use of force elements drawn from their own specific service branch. This method was instituted so that the previous improper and inefficient use of friendly elements in combined-arms operations could be minimized. This was of particular importance in the organization of joint operations between the Navy and ground forces. A final significant service which the Stavka representatives rendered in support of integration was to ensure the availability of forces for combined-arms operations. If the requisite quantities and/or types of forces were unavailable in a theater, the representatives could request that the Stavka reassign them from other, less critical geographic areas and distribute them appropriately.[25]

Today, the Soviet command maintains a "representatives' function" at various command levels as a method of achieving precise force integration and ensuring a constant and continual flow of information up and down the chain of command. For example, with respect to the centralized organization of integration between tactical ground (tank) and air assets, air representatives are to provide invaluable assistance:

"Accomplishment of precise coordination of aviation with tanks will undoubtedly require pre-planned organization of control over the air chast' and soedinenie used in support of tank forces. The most effective use of aviation and most rapid concentration of its efforts in the interests of tanks is possible only through its centralized control. ... It may also be assumed that, as in the past war, it will be necessary to assign to tank forces air representatives with the power of independently calling up aircraft and redirecting them at the request of the tank force commander."[26] (Emphasis added.)

Moreover, to facilitate the flow of information throughout the theater(s) of operation, the direct and mutual exchange of data between all levels of participating force elements is emphasized. The following quotation makes this point while referring primarily to Front or Army operations:

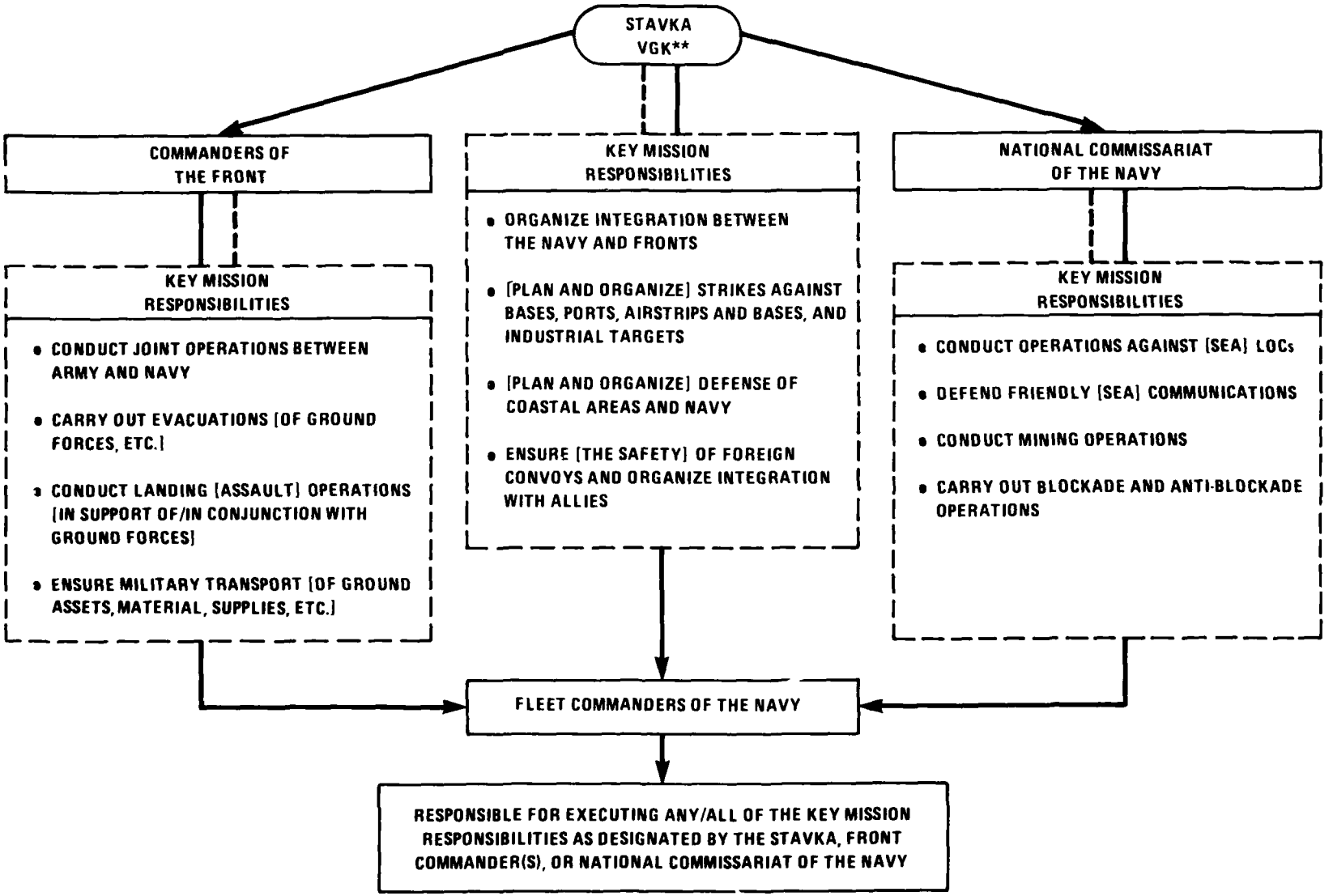
"Forms of contact between obedineniia in branches of the armed forces can be varied. One of them is the maintenance of constant communications using communications equipment. [But] the exchange by operational groups represents a higher form of contact. In the process, such groups can be assigned various functions from strictly informational to the authority to assign missions to subordinate troops and facilities. And, finally, the highest form of contact can be considered the creation of joint control points. Between branches of the armed forces carrying out uninterrupted

coordination over the duration of an entire operation, as a rule, contact is established at various levels right down to the tactical level."[27]

From a Soviet perspective the advent of nuclear weapons led to the requirement for an even greater degree of centralized control in planning and implementing integration than in the past.[28] Consequently, the Stavka representatives must now not only maximize the flow of information, but also "upgrade their operability and maintain even closer ties with the forces"[29] for effective integration in theater nuclear operations.

A final control procedure which deserves brief mention is the "flexible subordination" of force elements—a procedure which has existed, in basic content, from WWII until today. A clear example of its use can be found in the Soviet Navy's interrelationship with the ground forces in WWII theater operations. In essence, the Navy was responsible for carrying out operations either independently on the high seas or in support of the ground (Front) commanders. However, when performing in the latter role, "... the naval command, not realizing how complicated matters often became on land, did not always provide the desired amount of forces for coordinated efforts with the front."[30]

The Stavka's approach for ameliorating this situation was to create three possible avenues for controlling (and thus subordinating) the Navy based on mission requirements. (See Figure 2.2 for a detailed overview of this approach and its impact on force integration in WWII.) In essence, the Soviet Navy continued to control its own operations in maritime theater missions; when naval assets were needed



*Adapted from A. Basov, "Direction of the Navy in the Great Patriotic War," Morskoi Sbornik, No. 5, 1977, p. 25.
**Verkhovnoe Glavnokomandovanie (Supreme High Command)

FIGURE 2.2
Command Relationships in the Organization and
Execution of Integration for Combined-Arms Operations*

for support of ground force elements, however, the fleet commanders were subordinated directly to the Front commander(s). The third avenue (Stavka to Fleet Command) was apparently used infrequently, but did provide a channel for direct and rapid redistribution of naval assets if the need arose.

In sum, this procedure reflected (and reflects) the Soviet high command's proclivity for centralization in force integration. As Soviet Navy Captain A.V. Basov (in his excellent work entitled The Navy in the Great Patriotic War. Experience in Operative-Strategic Application) succinctly states:

> "The experience of the war illustrated an increase in joint operations between the army and navy, in the complexity in organizing their integration, and, moreover, the enhancement of 'mutually supportive for e allocation' between the arms of the military in joint operations. ...This has definitely brought forth new demands in commanding the forces--the most notable of which is the tendency for greater centralization of command."[31] (Emphasis added.)

2.3.2 The Commander's Knowledge of Force Integration. The concept of integration is of little use unless it can be practiced under the actual conditions of contemporary warfare. Therefore those responsible for its organization and implementation must have a keen appreciation of the concept, its intended use, and its attendant limitations. If this understanding is clear, force integration will contribute to the realization of ultimate military victory. The Soviet officer (the commander and his staff at all

levels) is thus required to have a firm grasp of the laws of war, the seven principles of military art, and the requirements and goals of force integration.[32]

The officer is expected to understand all of the primary features of integration appearing in the "checklist" below:[33]

1. The organization of force integration demands the decisive use of forces to exploit all friendly nuclear and conventional strikes.

2. Integration planning must be based on a common understanding of military objectives and must include the sequential completion of functions over time by designated participants.

3. The allocation of assets for integration requires an intimate knowledge of all friendly force capabilities, tactics, employment, etc.

4. The execution of integration requires an understanding of the importance of asset replacement, substitutability, mutual support, and the demands of a fluid battlefield.

5. The conduct of integration necessitates a continual flow of information, and maintenance of the pace and momentum of all combat activities.

6. The planning of integration requires knowledge of the enemy (including his capabilities, tactics, etc.) and of the possible ways in which integration may be disrupted.

In essence, the officer is expected to develop a deep appreciation for his tactical environment; moreover, he is expected to be capable of exploiting current military technologies which are useful to the organization and implementation of force integration.

How does the officer become capable of meeting all of these complex demands? In a word, he is instructed—both in the classroom, and in practical, realistic battlefield exercises. This instruction employs computers; slides, films and vugraphs; mock-ups of the battlefield, maps and charts; radios and microphones (for role playing in war gaming); mobile, field instruction vehicles equipped with much of the above equipment; and finally, "case studies" drawn from WWII situations. The student-officer is taught to appreciate the intricacies of force integration as well as the proper approaches to its organization and implementation.[34] Practical work (in the field) is viewed as the most effective instruction method, for "... only in the field during tactical training... can the student receive the real practice he needs and actually see the results of his efforts."[35] (Chapter III examines the potential ability of the Soviet officer to meet these challenges during actual combat, with emphasis on problems and vulnerabilities.)

2.3.3 Directing Force Integration: The Demands for Command Flexibility, Creativity, Initiative and Precision. Having discussed the importance of pre-planned centralization in the application of force integration, it may appear somewhat contradictory to include the concepts of "flexibility," "creativity," and "initiative" as concurrent requirements. This contradiction is only apparent from a Western viewpoint, however; from the Soviet perspective, the correlation of these requirements is obvious.

As discussed earlier, the Soviets regard integration as a unique process. It is planned and implemented to correspond with the specific requirements of each particular engagement, operation, or war. However, no matter how well it is pre-planned, "...integration is vulnerable to a myriad of disruptions which are most difficult to plan for in advance."[35] For this reason, it is clear that the commander and his staff must be capable of taking the initiative (within certain parameters) to respond flexibly and creatively to each new situation. As Colonel Savkin indicates about the importance of the situation itself,

> "In war the situation commands, but this subordination to the conditions of the situation cannot be understood in the sense of obedience... . The call of the situation must creatively and skillfully take account of the aggregate demands of [the] principles of military art. Without this, the creativity of a commander would be blind or adventuristic. ... The principles of military art act as regulators of the creativity of a commander, protecting him from arbitrary rule and adventurism, and directing him onto the path of making the correct decisions. The principles help creativity, but should not take its place or replace it. They should inspire the commander, but not suppress his initiative. No precise mathematical formulas for converting principles of military art into concrete actions exist, nor can there be any."[36] (Emphasis added.)

In short, a symbiotic relationship exists between the requirements for centralized control and its associated laws and principles on the one hand, and creativity, initiative and flexibility on the other.

Colonel Savkin alludes to another interesting aspect of integration in the last sentence of the statement above. In the modern era, the use of computer-based mathematical tools to assist Soviet commanders in planning and organizing integration is highly probable. However, as is suggested by the above citation, such decision aids cannot replace the rationally thinking commander. Therefore computers and associated software may provide invaluable support to the Soviet military in planning and implementing integration, but the technology itself is not a panacea for achieving integration.

The value of precision in planning and implementing force integration also is discussed extensively by the Soviets. Continual emphasis is placed on the importance of the commander's success in developing precise directives, prioritizing mission requirements, and then disseminating associated high priority tasks to subordinates. If these requirements are met, the commander is consequently able to economize on the use of time and to develop directives which are specific, precise, and intelligible. These outcomes are essential in modern warfare where time for the clarification of tasks and orders is likely to be nil.

The examination of actual Soviet operations orders helps to illustrate the degree of precision which is sought. A directive from the high command to the forces participating in the Manchurian campaign (WWII) provides a strategic level example:

> "The forces of the Trans-Baikal, 1st and 2nd Far Eastern fronts will commence military operations on August 9 to execute the missions laid down by the directives of GHQ on June 28.

> The air forces of all the fronts shall begin combat operations on the morning of August 9. The land forces of the Trans-Baikal and 1st Far Eastern fronts shall cross the frontier of Manchuria in the morning of August 9. The 2nd Far Eastern Front shall act in accordance with my (Stalin's) instructions. The Pacific Fleet shall introduce operational condition No. 1, [and] shall proceed with the laying of mines. All independent shipping shall be discontinued. The transport vessels shall be directed to assembly harbours for subsequent organisation of convoys to be accompanied by escorts (fighting ships), [and] the submarines shall be deployed in patrol zones. The fleet shall begin operations in the morning of August 9."[38]

Time, place, participants, and mission referents are all succinctly specified in this directive. At the operational-tactical level, such a directive would obviously assume a more specific nature, but would include all of the essential ingredients above. Figure 2.3 provides an illustrative example of specific directives (and their derivation) currently used by the Soviets for planning and conducting tactical force integration. While the figure presents a complex picture of ongoing tactical activities, it also provides the flavor of specific tactical integration orders.

When reviewing the various planning requirements for implementing integration, it should be remembered that they are promulgated for one essential reason: to ensure that successful integration occurs. In the Soviet view,

FRIENDLY BATTALION MISSIONS AND THEIR TIMELY COMPLETION	ANTICIPATED NATURE OF CONCURRENT ENEMY ACTIONS AND THEIR CONSEQUENCES	FORCES AND WEAPONS AVAILABLE T FRIENDLY COMMANDER AND ASSOC ACTIVITIES
1	2	3
1. Battalion moves from initial position to assembly area.	1a. Enemy conducts nuclear strikes against the friendly podrazdeleniia, especially during its movement.	1a. Air support [cover] provided by PVO Str defense] units . . .
	1b. Enemy aviation conducts [attacks] against friendly podrazdeleniia during movement.	1b. Artillery fire preparation begins at time "N against the enemy in ["N"] region . . . Descrip the fire preparation . . .
	1c. Description of likely zones of contamination and types of weapons used in the area . . .	1c. Friendly ground force advance to [zones destruction proceeds . . . Identification [desig of gaps [breaches] . . .
	1d. Artillery fire on the friendly podrazdeleniia.	
2. The friendly attack is launched and the battalion fulfills its first mission, to seize the border [area].	2a. Artillery fire and aviation [over] flights . . .	2a. Friendly air cover [support] . . . provided
	2b. Description of the forward region . . . support positions . . . major weapons used . . . obstructions [barriers] . . .	2b. Friendly artillery provides fire support to the enemy.
	2c. Enemy counterattack.	2c. Suppression of enemy's counterattack.
		2d. Sappers are added to support the friendly
3. Further development of the offensive in the designated direction . . .	3a. Artillery fire and aircraft [over] flights.	3a. Friendly air cover is provided . . .
	3b. Enemy defense at secondary positions. Construction of obstacles at borders . . .	3b. Artillery supports the offensive, suppress enemy.
	3c. Counterattack by the enemy's reserves.	3c. Enemy's counterattack is repulsed.

*Gen. Maj. N.E., Zabelyi, "Nuzhna opredelennaia posledovatel'nost' " ("A Definite Sequence is Needed"), Voennyi Vestnik, No. 5, 1980, pp. 40-41 This illustra

Figure 2.3 An Illustrative Example of a Soviet Approach to Organizing Tactical Inte

FORCES AND WEAPONS AVAILABLE TO THE FRIENDLY COMMANDER AND ASSOCIATED ACTIVITIES	CONTENT OF THE BATTALION COMMANDER'S INTEGRATION ORDER
3	4
1a. Air support [cover] provided by PVO Strany [air defense] *units* . . .	1a. Times, routes, formations, distances and speed of movement to assembly area are specified. Preparation and subsequent control of unit boundaries, march columns, and movement timing are specified.
1b. Artillery fire preparation begins at time "N" . . . against the enemy in ["N"] region . . . Description of the fire preparation . . .	1b. Signals and sequences of podrazdeleniia actions during enemy's nuclear strike(s) and aviation attacks are defined as are the sequence for replacement [substitution] of force elements, and the route for bypassing obstacles. Nuclear decontamination operations are planned.
1c. Friendly ground force advance to [zones of] destruction proceeds . . . Identification [designation] of gaps [*breaches*] . . .	1c. Specification of exploitation forces
	1d. Attack phase lines and weapons deployment specified.
	1e. Method is disseminated for clarifying subunit missions . . . Coordination of activities with the forward *defending podrazdeleniia* [*is organized*] . . .
2a. Friendly air cover [support] . . . provided.	2a. The timing, signals, and sequence of actions for tanks and motorized rifle companies in the attack are determined.
2b. Friendly artillery provides fire support to suppress the enemy.	2b. Enemy strike systems are prioritized as friendly targets.
2c. Suppression of enemy's counterattack.	2c. Plans specified for attacking the enemy on his flanks and rear. *Command issued for companies to provide* mutual support.
2d. Sappers are added to support the friendly advance . . .	2d. Elaboration of artillery targets and signals; also method for coordination [integration] of *actions with adjacent* [*forces*] and assets of the senior commanders.
3a. Friendly air cover is provided . . .	3a. Signal and sequence procedures for entry of second echelon units into battle are specified.
3b. Artillery supports the offensive, suppressing the enemy.	3b. Establish priority of artillery division actions, and the role of the battalion's first echelon company in support of the second echelon *entry into battle. Announce signals for targeting* and firing.
3c. Enemy's counterattack is repulsed.	3c. Sequence for further action by the podrazdeleniia to exploit the results of strikes on the enemy. Company *commander(s) issue* orders.
	3d. Sequence for attacks from the march; methods for bypassing battlefield obstacles; preparations for additional maneuvers . . .
	3e. Elaborating methods to repulse the enemy's counterattack . . . Proscribed sequence of integration with adjacent forces and regimental strikes assets. *Measures for protecting* the flanks.
	3f. Methods for identifying podrazdeleniia to friendly aviation.
	3g. Communications support of *podrazdeleniia integration*. Deadlines and priorities specified for subordinate unit operations.

...i Vestnik, No. 5, 1980, pp. 40-41. This illustration depicts the organization of integration for repulsing an initial enemy attack.

...ive Example of a Soviet Battalion Commander's
...Organizing Tactical Integration*

integration is an inherently delicate process--and the fulfillment of these requirements serves to reduce the possibility of its disruption. However, questions remain as to how effective the Soviets would actually be in meeting these demands during contemporary war. The following chapter, entitled "Soviet View of Vulnerabilities In Force Integration," addresses this issue in detail.

CHAPTER III

SOVIET VIEW OF VULNERABILITIES IN FORCE INTEGRATION

This chapter examines several specific vulnerabilities which the Soviets discuss as potential problems in the practice of theater force integration. The vulnerabilities presented here are derived from the two preceding chapters and from other candid discussions in Soviet military literature on the problems of force integration. The chapter is structured to present each Soviet-identified vulnerability, including resource availability, "uncoordinated" integration, command-associated deficiencies, and a number of theater-dependent variables. These vulnerabilities are examined in detail below.

1. RESOURCE AVAILABILITY AND THE APPLICATION OF RESOURCES TO SUPPORT FORCE INTEGRATION.

The successful practice of integration depends on the availability of essential military resources—from men and materiel to communications support and the continual flow of battle information. A major deficiency in any of these areas could seriously affect the execution of integration, thereby disrupting its pre-planned sequence of events and ultimately limiting the attainment of common military objectives.

The process of resource allocation itself also has a significant bearing on the success of integration. For example, if force element capabilities were misunderstood and misapplied in an operation it would seriously erode the chances for successful integration. If this failure were coupled with significant force attrition (as is anticipated during theater nuclear war), the problem would have serious consequences for the outcome of the conflict.

An examination of Soviet literature on such issues reveals an understanding of the potential implications of deficiencies in these areas. After recognizing the degree of force element attrition expected in a theater nuclear engagement, Colonel Skovorodkin, for instance, stresses the need for a highly responsive allocation process to maintain continuity in the practice of integration:

> "It is possible that there will be serious losses in troops and equipment in branches of the armed forces. ... In this period of greatest importance will be the organization for the rapid transition of obedineniia and soedineniia in branches of the armed forces to active operations... . [In essence] ... the organization and maintenance of coordination is the uninterrupted process of command activity in the control of forces and equipment in a dynamic and quickly changing situation of a modern operation."[1] (Emphasis added.)

Soviet military scholar G.A. Zubarev elaborates on this point, and also emphasizes that the availability of resources to the commander is a determining factor in the viability of integration:

> "The viability [durability] of integration is achieved by the direct availability of men and materiel to the commander which he can use to put into battle, thereby reestablishing fighting capabilities that have been temporarily diminished or lost entirely... ."[2]

In this regard, the role of second echelon and reserve forces (discussed in Chapter II) is vitally important to fulfilling this requirement. In short, force availability is a key factor in determining the viability of integration.

1.1 REASSIGNMENT AND MISAPPLICATION OF COMMITTED FORCES.

Another problem is the possibility that committed forces will be reassigned during the course of a battle, degrading ongoing missions. The Soviet commander in a theater, responsible for maintaining integration and having the resources at his disposal to do so, may find that an order from higher headquarters to redirect his assets to other, more critical operations seriously degrades his ability to conduct integration. An example from the Soviet Navy's WWII experience aptly illustrates this problem. In August 1941, the Black Sea Command was directed to relinquish a portion of its aviation assets to support joint operations elsewhere. However, the command was extremely reluctant to comply, stating that its assets were essential for fulfilling its "own" pressing missions at sea.[3] The aviation assets were ultimately recommitted, but the situation underscores the importance of command perspective on the force integration missions at hand.

As a final observation on force assets, the possible misapplication of available resources also should be considered as a vulnerability. As discussed in Chapter II, for instance, the Soviet Navy in WWII was often... "given tasks without consideration of its capabilities."[4] Additional examples of the unrealistic application of resources can be found elsewhere in the Soviet literature, and lead to the conclusion that allocations have not always gone smoothly in the past and therefore may not in the future.[5]

1.2 CONTINUITY OF COMMUNICATIONS AND RESERVE RESOURCES.

The viability of integration also relies on preserving the continuity of communications lines, and strict maintenance of a timely and complete flow of information across

those lines. These requirements may be extremely difficult to meet during the conduct of theater nuclear warfare since key nodes will be subjected to destruction and weapons effects will "black out" critical nets which rely on atmospheric transmissions. Consequently, the essential communications links (or portions thereof) between the strategic command and its subordinate operational-tactical command levels may be partially or completely disrupted for periods of time. As one Soviet author states "... there should not be ruled out ... the possible disruption of contact between the superior command and one or another of the obedinenie."[6] Moreover, the reestablishment of communications may also prove difficult. Nevertheless, the maintenance of integration demands not only the continuous flow of information, but also the capacity to rapidly reinstate this flow if it is interrupted:

> "The destruction of integration in the offensive occurs most frequently as a result of nuclear strikes, the attrition of friendly strike systems, and the loss of lines of communication between the other [force elements] participating in the integrated operation. ... Should communications be broken between these cooperating force elements, the commander and his staff [must] take extraordinary measures to reinstate the communications using the means of the reserve force elements."[7] (Emphasis added.)

1.3 FACTORS LEADING TO "UNCOORDINATED INTEGRATION."

In instances where the availability of such reserve resources is not a constraint, other vulnerabilities related to their effective use in supporting integration may also arise. Several of these potential shortcomings deserve brief examination.

First, integration may break down if reconnaissance and troop warning/identification systems do not function fully or are inappropriately employed. Although this appears to be an obvious conclusion, its ramifications are as consequential as those for the other vulnerabilities discussed previously. For example, reconnaissance failures may result in an inefficient application of weapons against less important or even non-existent targets. This point is reinforced in Marshal Zakharov's recollections of the Battle of Kursk, where he indicates that: "... air strikes were scattered... and artillery fire was often directed at areas where there were no enemy troops and weapons."[8]

Another aspect of "uncoordinated" integration is the possibility of mutual interference by friendly troops in destroying enemy targets. In essence, this problem involves the potential lack of coordination in target-related assignments on a complex nuclear battlefield. This would lead to the uneconomical application of friendly weapons, and could theoretically deplete friendly strike assets without purpose. Therefore, from the Soviet standpoint, target assignments should be rationally assigned and integrated between force elements "... to exclude the possibility of creating mutual interference in carrying out attacks; (... this applies especially to rocket troops and aviation.)"[9]

Well-designed target acquisition and tactical alert systems could partially alleviate this problem by enhancing awareness of potential problems before they occur. As Zubarev attests,

> "Great significance in maintaining constant integration is attached to a unified system for orienting [the forces], for reciprocal [mutual] force identification [and] target acquisition, and to a knowledge of all

[warning] signals. The presence of these features and a firm knowledge of the [warning and identification] system of signals ensures that the forces participating in integration can be quickly oriented in the tactical environment, can rapidly identify targets for destruction, and are able to quickly fulfill their main missions."[10]

A final factor related to resource availability is the level of readiness of committed forces. If forces are unprepared (for whatever reasons) to fulfill their respective missions, integration will be seriously impeded. Hence, although "... it is not ruled out that during ... an operation not all troops and equipment of the armed forces will be ready for immediate launching of attacks...," it is desirable that such occurrences be minimized, especially in a theater nuclear context:

"In the interests of close integration by friendly forces employing nuclear weapons, it is demanded (along with other requirements) that assets be in excellent operating order and continually ready for use... ."[12]
(Emphasis added.)

The central question which remains is whether or not the Soviets will be able to achieve and maintain readiness at key points in the battle environment when rapid exploitations must be undertaken. A lack of tactical or operational readiness could lead to a failure in force integration and have important consequences for the outcome of the battle.

In concluding this discussion of resource availability and its crucial relationship to integration, it is important to note that the factors discussed must be managed by the respective command elements at each level of the operation.

These command elements are therefore an important component of the integration process, and deserve close scrutiny. The following section examines the "integration" of these command elements (e.g. commanders and staffs) with available resources, emphasizing the implications of this interrelationship for Soviet force integration.

2. COMMAND DEFICIENCIES AND THE HUMAN FACTOR AS VULNERABILITIES OF SOVIET FORCE INTEGRATION.

Earlier in this report, the optimal planning and implementation process for integration was examined in some detail. Based on that discussion, it becomes evident that the various individuals (command elements) who are actually responsible for conducting the process play an integral role in its successful application. The capability of these individuals to do so, however, depends upon the presence of a number of essential factors—and their absence could effect the success of Soviet force integration.

2.1 THE COMMANDER'S KNOWLEDGE.

One of the most important of these factors begins with the commander's capacity to fully appreciate the intricacies of integration; to subsequently extract the most important missions for high priority completion by his subordinates; and to draw upon his own (and others') prior experience in conducting integrated operations, thereby enabling the formulation of appropriate contingencies for possible changes on the battlefield.

The quality of the commander's own knowledge regarding integration is therefore a key factor in determining its successful conduct. Lt. Colonel V. Sokolov, in his extremely candid article entitled "Close Integration—A Guarantee of Victory in Battle," confirms this perception:

> "Practice shows that integration is the most successful when organized by officers who understand the tactical environment well, know completely the capabilities of the weapons and [supporting] technology, clearly appreciate the nature of contemporary combined-arms operations, are able to correctly grasp the intentions of their senior commander, clarify in detail military missions (their own and those of adjacent forces), and know well the military capabilities and principles for applying ... the various types of force elements ... ."[13]

This description provides a model which all Soviet command elements should strive to use in achieving force integration. The model suggests that perfect knowledge of facts and intentions will lead to perfect harmony in the conduct of operations.

However, as even the Soviets candidly admit, this model is difficult to attain because it is constrained by the realities of each situation. First, individual commanders may hold differing views of the enemy threat, undermining the basis for conducting integration. The illustration earlier in this chapter of the Black Sea commander's negative reaction to a directive requiring the redistribution of his aviation assets highlights this possibility. In that example, the Soviet commentator's estimation was that this particular naval commander was slow to relinquish his assets "... even though no immediate threat in his own area of operations existed."[14] Although the commander eventually did comply with the directive, the situation makes the point that compliance may come slowly

and may be based on a commander's perspective of his own immediate battle environment. It is clear that slow compliance would be unacceptable on the nuclear battlefield, and that such insubordination would impact on the prospects for force integration.

The commander's own perceptions on the relative importance of integration and its organization may also impinge on its viability. One manifestation of this problem is frankly examined by Zubarev. Writing on the essential role which the commander plays in establishing and maintaining force integration, he makes the following critical assessment:

> "Determining military missions and organizing integration are [parts of]a unified process in the [overall] direction of troop activities—[all of which] are undertaken by the commander and his staff. Along these lines, two extreme tendencies have been observed in the practical work of some commanders. [One of these] is that the commander, not attaching enough significance to force integration, decides to waste as little time as possible on its [planning and organization]. The other extreme, on the contrary, occurs when the commander has such a fetish regarding force integration, that in organizing it he attempts to analyze each and every issue in such great detail, examining all the data at such great length (upon which the missions he assigns to his subordinates are based) that he wastes a great deal of time to the detriment of all other required measures."[15]

In short, the tendencies illustrated above have the potential for disrupting the practice of integration and would have serious long term consequences for the battle itself. As Zubarev subsequently maintains, "these tendencies are, of course, completely erroneous. The matter at hand is not just to organize integration, but to practice it."[16]

2.2 FAILURES IN THE PRACTICE OF FORCE INTEGRATION.

The successful practice of integration requires much more than the addressal of these two potential errors (above) in its organization and planning. For example the command element also must be able to fulfill the force integration requirements which were enumerated in Chapter II. Although the requirements are clear, Soviet military authors point out that many commanders (particularly at the operational-tactical levels) fail to address them or instead address them in a mediocre fashion. Comments by Captain V. Markuzov illustrate this point:

> "In organizing integration, the commanders, particularly the younger ones, almost always encounter certain difficulties. Many are unable to consistently set forth missions for their subordinate commanders; some forget about the adjacent [force elements] operating in conjunction [with their own]; and others do not fully utilize the capabilities of their own assets. On occasion, officers, failing to coordinate properly the activities of combined-arms forces ..., pay too much attention to secondary concerns. How shameful to encounter a commander who does not comprehend his own intentions and conducts a joint operation without applying [the proper and necessary] integrative approach."[17]

Although it is difficult to say whether these problems would also arise for senior operational commanders, the quotation does suggest that variations in the quality of integration might occur.

The frequency and quality of practical exercise work in the field also have an impact on the commander's ability to conduct integration. These exercises assist the commander in developing an experiential basis for later efforts in applying integration. This requirement, however, is also a point of contention and concern for the Soviet military. As indicated in the following quotation, there may be a shortfall in this area: "Unfortunately, not all commanders... have adequate experience in organizing force integration,"[18] even though "... the best school for achieving this practical experience in the application of [the integrative] process is through tactical training."[19] Although it appears that this problem could be solved simply by increased training, a key factor in such training would be the degree of realism attainable in replicating operational or strategic environments. The Soviets have certainly considered this problem but their solution to it is not clear from the unclassified literature reviewed for this report. What <u>is</u> clear, however, is the fact that they intend to use the results of such exercises to improve force operations:

> "The military art of future warfare is to a certain extent developed and refined on training fields and firing ranges, during exercises and maneuvers carried out by headquarters, troops, air and naval forces, and during tests of new military equipment... . Exercises and maneuvers comprise a multifaceted

> experimental basis for developing ways and means of carrying out combat operations and checking theoretical conclusions and proposals as well as for working out new problems in military art. The task consists in using this very rich data base intelligently; accumulating, synthesizing and analyzing the results of exercises; compiling, on that basis, scientific forecasts; and introducing everything of value into practice."[20]

The important supportive role played by the commander's staff in planning and organizing integration has already been mentioned. There are a number of staff-related problems which could detract from integration, and they are discussed briefly below. First, even if the commander is sufficiently versed in the intricacies of integration to organize it effectively, staff deficiencies may cause the process to fail. Moreover, the staff may also fail to perform adequately due to the commander's inability to provide clear, concise direction for its work, or because of his tendency to give unnecessarily repetitive instructions regarding obvious tasks.[21] The tedious and/or wasteful use of the staff by the commander would certainly have a deleterious effect on force integration because of the ongoing requirement to have the staff modify planning and develop appropriate contingencies in a timely fashion. Neither of these tasks would be performed efficiently without appropriate staff-commander relationships.

One final comment should be made regarding command deficiencies as potential vulnerabilities of force integration. It is possible that the practice of the integrative

process could be overtaxed because of the Soviet military's proclivity for bureaucratic centralization and rigid, multi-tiered command levels. While oligarchy and collective decision-making may have their virtues in the Soviet political arena, this command approach could detract from the success of integration (especially under the stressful, rapid and fluid conditions of nuclear warfare). While there is certainly no proof that this tendency will occur, it is nevertheless a factor worthy of consideration.

Western analysts also should avoid being misled by seemingly neat and convenient "wiring diagrams" which trace the flow of integration's planning and conduct through the various Soviet command levels (strategic, operational and tactical). The Soviet experience in WWII, for example, illustrates that decision-making hierarchies were in essence only formal guidelines that could be modified to accommodate the situation(s). A key related point is that such modifications were sometimes made only after a tactical or operational disaster had occurred. While one could conclude on a positive note that practical experience thus proved to be an excellent method for learning how to integrate, it is also true that the pace of contemporary warfare will mitigate against the success of the same learning pattern. The first major mistake in organizing integration may prove to be the last one that is necessary in determining the outcome of a future battle. The Soviet WWII experience also demonstrates that the actual chain of command can be rather fluid, especially at strategic-operational levels. The subordinate Soviet commander in the field, therefore, must be capable of responding not only to rapid changes brought on by enemy actions, but also to changes in the flow of friendly command directives.

Commanders and staffs at all levels are important actors in the process of planning and implementing force integration. Their potential deficiencies, however, could place a great strain on the viability of the process. The final section of this chapter shows that no matter how well qualified a commander and his staff prove to be in planning and conducting integration, other variables in the theater itself may prove to be deciding factors in the ultimate success or failure of integration.

3. THEATER-DEPENDENT VARIABLES AS VULNERABILITIES OF SOVIET FORCE INTEGRATION.

The success of Soviet force integration is highly dependent upon the nature of the theater environment in which it is applied. It is also dependent upon the capability of the Soviet military to understand and cope with a number of specific, theater-related variables which are component parts of this overall environment. This section briefly assesses theater variables such as terrain peculiarities; theater size and geographic location; weather; the conduct of night operations; and finally, pace and timing. These variables are examined with emphasis on their potential implications for the viability of force integration during contemporary warfare.

3.1 TERRAIN PECULIARITIES, THEATER SIZE AND GEOGRAPHIC LOCATION.

The conduct of force integration is influenced by the presence in the theater environment of irregular, swampy and/or rough terrain; sizeable expanses of forest, mountains, hills or desert; rivers; large (or numerous small) bodies of water; and densely populated urban areas. Although these obstacles may play an important role in the defense

of friendly forces by restricting enemy activities, they also pose potential problems to friendly commanders faced with maintaining continuous force integration in offensive operations. Barriers such as these may drastically curtail the effectiveness of mutually supportive offensive operations when forces are channelized and communications are cut off as a result.

Specific plans are thus required for theater areas where such terrain features pose potential problems for the success of integration. When adequate time is available for preparations to overcome these problems, the integrated operation may succeed in spite of them. Terrain features also may pose problems that are transformed into operational advantages through excellent planning. For example, as General S.M. Shtemenko notes in his recollections on the WWII Manchurian Campaign (1945), the success of that operation was realized in part because the Soviet military exploited the terrain features of the area in an unexpected manner:

> "The terrain was also... used as a surprise factor. It would have been quite natural for the enemy not to expect any attacks at all, let alone tank attacks (which were ultimately conducted) through inaccessible mountains, taiga and desert. ... Mountains chains, the thickets of the taiga and the desert quicksands all became allies of Soviet arms despite the claims of formal logic."[22]

Hence, the skillful use of difficult terrain served to enhance success in this particular operation.

It is difficult to offer a single assessment on the general effect which terrain will have on force integration. Various terrain features may be disadvantageous to certain types of operations, but some disadvantages may be overcome by extensive prior planning. This planning also may result in the unanticipated use of terrain to accomplish objectives in support of integration.

The overall size and geographic location of specific theater(s) will also have a major effect on the implementation and maintenance of force integration. Special forms of integration may have to be utilized to overcome such theater peculiarities. Soviet commentary on special circumstances in the Manchurian Campaign illustrates how different theaters may affect force integration, as well as how associated problems were solved in that case:

> "... the operations against imperialist Japan differed significantly from those in the West [against the German Forces]. The great size and remoteness of this theater of operations, [and] the complexity and variety of the forces and means engaged created additional difficulties. In the West the neighboring fronts had as a rule advanced in parallel, in close contact to one another. In the Far East, owing to the enemy's unusual position, they would have to launch converging attacks from three different directions with the active assistance of the Navy. A powerful and competent agency of command would be needed to maintain effective coordination between them."[23]

The practice of force integration therefore varies with the theater in which it occurs. An analysis of specific integration procedures for one theater may, therefore, provide only an imperfect understanding of those for another theater. This problem must be accounted for in deriving implications from any of these analyses.

3.2 THE VARIABLES OF WEATHER AND NIGHT AS POTENTIAL VULNERABILITIES OF FORCE INTEGRATION.

Weather is a common factor in all military planning because of its potentially disruptive influence; it is briefly discussed here only to provide an exhaustive treatment of each of the major theater-dependent variables which may effect the integrative process. Obviously, inclement weather conditions such as high winds, fog, rain, cloud cover or extreme temperatures each have a decisive effect on combat activities in general. Visibility is reduced, men and materiel often suffer, target acquisition may be difficult, and under conditions of high winds, nuclear and chemical contamination is less easily contained. It is therefore easy to postulate how adverse weather might impact on reconnaissance, ground force movement, or strikes conducted in an integrated operation. Adverse weather would have individual effects in each of these areas and an overall effect on force integration per se.

It should also be noted that adverse weather conditions may be exploited to the advantage of friendly forces; the prospects for successful integration may be enhanced if operations are conducted when enemy forces least expect them. General S. Shtemenko provides an excellent illustration of this possibility. Describing the initiation of Soviet offensive operations in the Far East during WWII, he notes that:

> "We also banked on the enemy's assumption that Soviet troops would not launch an offensive in unfavorable weather conditions. In point of fact, the timing of operations against Japan agreed (to) with the Allies—'two or three months after the end of the war with Germany'—brought us into the rainy season in the Far East, which from the standpoint of formal military logic was most unfavorable. According to all the rules of this logic, the Japanese command would be expecting our attack a little later, when fine weather set in. It turned out later that the General Staff had not been mistaken in this assumption. The Japanese Command had expected the war to begin in the middle of September."[24]

The exploitation of unfavorable weather conditions clearly requires a greater degree of planning for integration compared to operations conducted during favorable weather conditions. In general, it might be expected that a more flexible time schedule would have to be established for adverse weather operations. Contingency plans would have to account for other problems including the inability of units to meet objectives (e.g., to strike targets on time). Adverse weather operations would involve greater risks, but could have greater payoffs as well. The key question is whether or not successful force integration could be maintained under this adversity.

The performance of integrated operations at night or during twilight is difficult due to "... a reduction in visibility, difficulties in orienting friendly force

elements, the negative impact which night has on troop command and control, and the greater difficulties in achieving mutual identification by [adjacent] friendly forces."[25] Consequently, those responsible for planning integration "... must not only resolve the typical questions associated with integration, but must also contend with issues regarding lighting, orientation of force elements, and use of night vision devices."[26] However, as Colonel N. Vinokur points out in an article on conducting tactical level integration at night, deficiencies remain:

> "Some commanders ..., especially those recently assuming command responsibilities, ... experience particular problems in organizing integration at night."[27]

Since integration is a process which must be conducted continuously at all command levels including the tactical level, such deficiencies decrease the prospects for successful force integration during conditions of limited visibility. Extensive field training in conducting integrated operations at night could substantially reduce these problems for individual tactical units, however. The key question which remains is whether or not tactical training would be sufficient to ensure successful operational (theater) level night maneuvers including coordinated strikes against enemy targets.

3.3 TIMING AND THE PACE OF MODERN COMBAT AS INHERENT VULNERABILITIES OF INTEGRATION.

These final factors are more important than any other factor affecting the prospects for successful force integration during contemporary theater nuclear warfare.

This is true for two reasons: first, because the Soviets attach great importance to the roles which the rapid pace of combat and decisive timing will play in achieving military victory; and secondly, because these factors are interrelated with force integration, each depending on the other for success. Therefore, possession of a rapid decision-making capacity, strict observance of pre-planned combat schedules, and maintenance of the rapid pace of combat activities become truly central considerations in the operability of the integration process.

The factor of time has become preeminent for achieving victory during nuclear warface generally and, as will be demonstrated, for conducting integration against high priority targets specifically. Colonel Savkin reinforced this supposition about importance of time when he said that:

> "Time has always played an important role in military affairs. But today its importance is far greater than it ever was in earlier eras. Nor are we wrong in stating that, in addition to becoming more vital, time has acquired new meaning. It has in fact become one of the most important components for success in battle."[28] (Emphasis added.)

The associated requirement for maintaining continual (timely) force integration during combat is also a high priority for the Soviets. G.A. Zubarev has provided insightful commentary on this issue:

> "Force integration throughout the course of the battle must be maintained constantly. Even the most minute disruption in integration reduces the

> effects of a strike against the enemy, and if the disruption is significant, this will lead to disorganization of the operation, lower the troops' overall fighting capability, and provide the enemy the opportunity to take necessary countermeasures. Hence, to avoid such problems ...the forces must unconditionally fulfill their missions in strict accordance with the element of time. This can be achieved only if the commanders and their staffs practice constant troop control, forecast [possible] changes in the combat situation, [and] correctly appreciate the significance of fulfilling the military missions ... within the shortest time possible without reducing the pace of operations... ."[29]
> (Emphasis added)

Thus it is essential for theater commanders to quickly assess the overall combat situation, rapidly make any necessary alterations in the overall force integration plan, and to ensure the "rapid delivery of instructions to subordinates in the course of an attack, especially when it is necessary for a sharp change in the missions assigned the troops."[30]

Accurate and timely reconnaissance data is also essential if theater commanders are to complete these requirements. This data is necessary so that the timely delivery of warheads on targets can be carefully orchestrated. However, it is possible that there will be shortfalls in rapidly acquiring and analyzing this data because of the signature reduction techniques employed by forces on a nuclear battlefield, or due to rapid changes in the target

array caused by the swift pace of combat. Timing will take on even greater significance because of this potential disruption in the reconnaissance-strike system targeting data cycle.

The contemporary importance of the time factor cannot be overstated and stands in sharp contrast with the past. Due to the relatively slow pace of operations in WWII, Soviet military planners usually had sufficient time to adjust their plans during the course of an operation.

Today, however, under the conditions of rapid theater nuclear warfare, time will be extremely limited. The Soviet military is keenly aware of this fact and continually exhorts its officers at all levels to prepare themselves for operations under extreme time constraints. This is caused by the fact that: "Now the situation on the battlefield changes by minutes and even seconds rather than by hours ... . Under these conditions, commanders and staffs should consider and value not only hours, but also minutes and sometimes even seconds."[31]

However, this situation causes at least one Soviet commander some discomfort. Alarmed that carelessness in planning may result in this high intensity environment, he strongly urges that it is:

> " ... better to take a few extra ... minutes before the battle ... to thoroughly resolve all issues and be sure that each participant firmly understands his role, rather than make mistakes in combat that reflect a mistaken or incomplete understanding of ... the directives."[32]

Certainly this suggestion is a rational one. However, that fact remains that the success of integrated theater operations will ultimately be decided "in minutes, and even seconds" and that "even the most minute disruption in integration" could effectively undermine its viability and the attainment of military victory. In the final analysis,

> "The tendency [towards having only a] very abbreviated amount of time for preparing combat operations, especially at the beginning of the war, demands that the search continue for more intensive and effective measures for organizing force integration and for maintaining it uninterruptedly throughout the combat .. ."[33]

Thus, the Soviets will continue to search for measures to enhance the timely attainment of force integration. What this section has pointed out, however, is that the issue of timely force integration carries within it the seeds of its own destruction; without proper timing, force integration cannot be achieved. Herein lies the greatest apparent vulnerability of the process.

3.4 SUMMARY REMARKS.

Soviet discussions of force integration include candid comments about potential problems in its execution. These problems include:

- The criticality of having required forces available for mission execution;
- The possible misapplication of forces during an integrated operation;

- Potential shortfalls in command responsiveness to changes in force commitments for integration;
- The likelihood of post-H-hour communication failures among participating forces;
- The prospect of inefficient strike allocations caused by excessively overlapping target coverage;
- Possible post-H-hour deficiencies in force readiness;
- Insufficient knowledge of threat intentions;
- Command/staff deficiencies (e.g., training, practice);
- Theater-specific factors (e.g., difficult terrain, inclement weather); and
- Failures in timing to achieve integration.

This chapter has provided general Soviet views on each of these problems. The presentation of these views demonstrates first that the Soviets are aware of possible problems in executing successful force integration and, second, that they seek solutions to the problems. The presentation addresses the first point but does not include any solutions except in very general terms.

According to the Soviets, "deficiencies" are to be overcome; "sufficient" forces are to be made available, and "proper" timing is to be attained. It is in this fashion that the potential problems are "solved," at least in this study. Such generalities reflect the somewhat imprecise nature of the study data base itself: general definitions have been provided for types of force integration; central

features of the process have been broadly discussed; and general guidelines have been enumerated. Such generalities are a characteristic feature of unclassified Soviet operational art. The reader should note that while such writings on operational art provide a good overall perspective on Soviet military thought, these writings must be coupled with other (primarily classified) data on force capabilities and intentions for greater precision in understanding.

Thus it is difficult to determine from this study whether or not the Soviets have solved the stated problems, or if the problems can be solved at all. Similarly, it is not clear how the Soviets would specifically prioritize the identified problems, and/or which problems are subject to greatest impact by U.S. countermeasures.

A key conclusion is that additional assessment is required before these subjects can be addressed in detail. This assessment should include a review of related work already conducted and might also require new analysis. The list of Soviet-identified force integration problems should serve as an initial guide for this assessment, focusing on such areas as:

- Actual Soviet forces/units which could be allocated for missions in a particular theater (capabilities, locations, etc.);
- Specific Soviet reconnaissance collection capabilities including assessment of technical methods, platforms, downlinks, ground station processing, analysis, timing requirements;
- Front/Army (or equivalent level) communications systems for friendly force status updates and

decision-making: types of systems, information transmitted, timing, redundancies, skip-echelon capabilities, etc.;

- Soviet command/staff practice of force integration: frequency, military organizational level of practice, linkage with other service activities, apparent proficiency; and

- The target array from a Soviet perspective: based on this study, special attention should be focused on the U.S./NATO TNF disposition during postulated conflict and associated Soviet strike timing requirements.

Conclusions gathered from such data assessments would allow a realistic prioritization to be made of the identified Soviet force integration problems. This would in turn lead to meaningful conclusions about U.S. countermeasures to significantly degrade Soviet force integration.

In the final analysis, the goal of Soviet force integration is to bring appropriate military forces to bear on a situation at the proper time to achieve victory. The goal requires the availability and readiness of appropriate forces; knowledge of both friendly and enemy situations (e.g., status, readiness levels, capabilities, etc.) and an understanding of and capability to execute properly timed activities. Effective communications are required to support each of these features, providing a fundamental baseline for efficient integration. U.S. actions which adversely impact on Soviet communications or on the type or amount of data transmitted via these means of communications will have a major impact on the timing of integration. Until further assessment is performed, these vulnerabilities should be treated as preeminent in degrading Soviet theater force integration capabilities.

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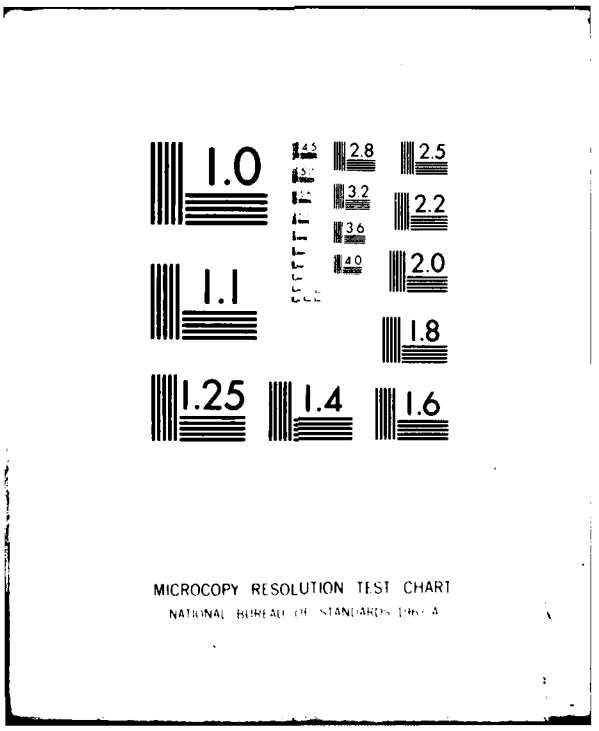
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[26]Zubarev, p. 73; For an in-depth discussion of coordinating combat at night based on the Soviets' WWII experience, see Gen. Maj. B. Panov's article, "Osobennosti vedeniia boevykh deistvii noch'iu po opytu voiny" (Peculiarities of Conducting Military Operations at Night Based on the Experience of War"), Voenno-Istoricheskii Zhurnal, No. 10, 1980, pp. 10-17.

[27]Vinokur, p. 20.

[28]See J.D. Douglass, Jr., The Soviet Nuclear Offensive (Washington D.C.: U.S. Government Printing Office (published under the auspices of the USAF), n.d.), p. 81, for citation of D.D. Gorbatenko, Faktor vremeni v sovremennom boiu (The Factor of Time in Modern Combat) (Moscow: 1972), p. 38.

[29]Zubarev, p. 28.

[30]Col. V. Ye. Savkin, The Basic Principles of Operational Art and Tactics. (A Soviet View). (Washington, D.C.: U.S. Government Printing Office (published under the auspices of the USAF), n.d.), p. 187.

[31]A.A. Sidorenko, The Offensive. (A Soviet View). Published in Russian, Moscow: 1970 (Washington, D.C.: U.S. Government Printing Office (trans. and published under the auspices of the USAF), n.d.), pp. 60-61.

[32]Markuzov, p. 36.

[33]Zubarev, p. 4.

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U.S. Air Forces in Europe
ATTN: USAFE/DO&I

Commander-in-Chief
U.S. Air Forces in Europe
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Commander-in-Chief
U.S. Air Forces in Europe
ATTN: USAFE-DOJ

Commander-in-Chief
U.S. Air Forces in Europe
ATTN: USAFE/IN

Commander-in-Chief
U.S. Air Forces in Europe
ATTN: USAFE/XPX

USAF School of Aerospace Medicine
ATTN: Radiation Sciences Div

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Commander-in-Chief
Department of the Air Force
U.S. Readiness Command
ATTN: J-3

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ATTN: OSR/SE/F

Federal Emergency Management Agency
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ATTN: D. Bensen
ATTN: Assistant Associated Dir

U.S. Arms Control & Disarmament Agcy
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ATTN: M/S634, T. Dowler
ATTN: R. Sandoval

Sandia National Lab
Livermore Lab
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ATTN: Dr Pugh

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Hudson Institute, Inc
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McLean Rsch Ctr, Inc
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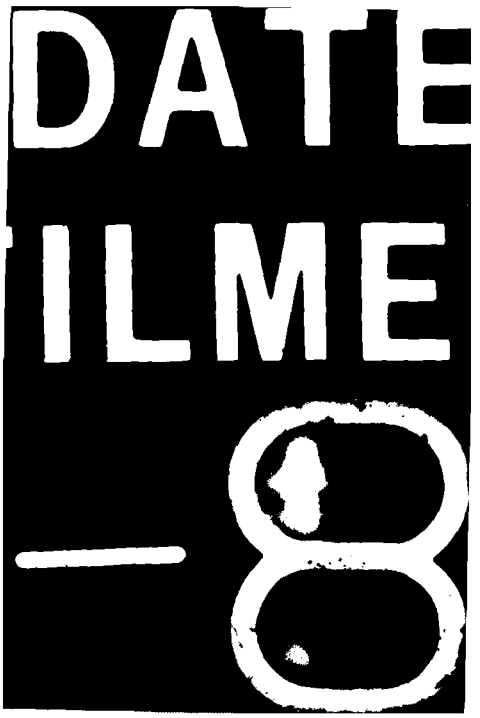
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